CAMERA CATALOG
ALL MODELS

TOSHIBA TELI CORPORATION

CAMERA TABLE

		VGA	XGA	SXGA (1.3M)	UXGA (2M)	2M	4M	QSXGA (5M)	6.5M	12M
USB3.0	B/W	BU030 BU031	BU080	BU130		NEW **BU205M	NEW *BU406M			
	COLOR	NEW *BU030C/CF		NEW *BU130C/CF			NEW **BU406MC/CF			
Gig-E(PoE)	B/W	BG030 BG031	BG080	BG130	NEW *BG202					
	COLOR	NEW *BG030C/CF		NEW *BG130C/CF	NEW **BG202C/CF					
Gig-E	B/W	CSGV90BC3-B	CSGX36BC3-B	CSGS20BC2-B CSGS15BC23-B	CSGU15BC18-B					
	COLOR	CSGV90CC3-B	CSGX36CC3-B	CSGS20CC2-B	CSGU15CC18-B					
IEEE1394	B/W	CSFV90BC3-B	CSFX36BC3-B	CSFS20BC2-B	CSFU15BC18-B					
	COLOR	CSFV90CC3-B	CSFX36CC3-B	CSFS20CC2-B	CSFU15CC18-B					
CoaXPress	COLOR									CSX12M25CMP19
CAMERA LINK (PoCL-Lite)	B/W	CSCLV90BC3								
CAMERA LINK	B/W	CSCV90BC3 CSCV125BC3	CSCX30BC3	CSCS20BC2	CSCU15BC18 CSCU30BC18			CSCQS15BC23	CSC6M85BMP11	CSC12M25BMP19-01B
	COLOR	CSCV125CC3			CSCU30CC18			CSCQS15CC23 CSCQS9CC23	NEW **CSC6M85CMP11	CSC12M25CMP19

*new release **plan to be added

Flexible Image Sensor

Loaded with image processing intelligence, various interfaces, a range of camera controls, and many kinds of sensors to solve our customers' problems. Toshiba Teli provides optimal solutions by flexibly meeting customers' needs for a wide range of image sensing equipment.

Flexible Sensor — A variety of optical sizes, pixel counts, and readout methods

Flexible Intelligence — Built-in function to perform a variety of intelligent image processing

Flexible Mechanic — Compatible with a variety of shapes and camera heads

Flexible Interface — Compatible with a variety of interfaces; affinity with peripheral equipment

Flexible Control — A variety of controls and easy-to-understand GUI

INDEX

GROUP.		MODEL.			PAGE.
Digital Cameras					
BU Series	USB3.0	**BU031** **BU030** **BU080** **BU130** ****BU205M** ***BU406M** ***BU030C/CF** ***BU130C/CF** ****BU406MC/CF**			P7
BG Series	Gig-E	**BG031** **BG030** **BG080** **BG130** ***BG202** ***BG030C/CF** ***BG130C/CF** ***BG202C/CF**			P8
CSG Series	Gig-E	**CSGV90BC3-B** **CSGX36BC3-B** **CSGS20BC2-B** **CSGS15BC23-B** **CSGU15BC18-B** **CSGV90CC3-B** **CSGX36CC3-B** **CSGS20CC2-B** **CSGU15CC18-B**			P9～P10
CSC Series	Camera Link	**CSCLV90BC3**			P11
		CSCV125BC3	**CSCV125CC3**		P12
		CSCV90BC3 **CSCX30BC3** **CSCS20BC2** **CSCU15BC18**			P13
		CSCU30BC18	**CSCU30CC18**		P14
		CSCQS15BC23	**CSCQS15CC23**	**CSCQS9CC23**	P15
		CSC6M85BMP11	****CSC6M85CMP11**		P16
		CSC12M25BMP19-01B	**CSC12M25CMP19**		P17
CSX Series	CoaXPress	**CSX12M25CMP19**			P18
CSF Series	IEEE1394	**CSFV90BC3-B** **CSFX36BC3-B** **CSFS20BC2-B** **CSFU15BC18-B** **CSFV90CC3-B** **CSFX36CC3-B** **CSFS20CC2-B** **CSFU15CC18-B**			P19～P20

*new release **plan to be added

GROUP.	MODEL.			PAGE.
Smart Photo Sensor	**SPS02**			P21
Color Camera	**CSDW2M60CM28**			P22
	CSDS60CM3			P23
	CS9001 Series			P24
B/W Camera	**CS4000B Series**			P25
	CS8550Di/-50	**CS8550i-01/-51**		P26
	CS8560BD	**CS8570D**		P27
	CS8620Bi **CS8630Bi** **CS8620BHi** **CS8630BH**			P28
Monitor/LCD Display	**9LM20SB**	**T05SSB003**		P29
	VR570			P30
Accessories	Power supply adapter/Cable/Camera mounting kit compatibility table			P31
	Power supply adapter			P32
	Cable			P33
	Camera mounting kit			P34
	Lens			P35～P39
Appendix	Connection example			P40
	Glossary			P41～P44
	Spectral sensitivity characteristics			P45～P46
	PIN assignment			P47
	Available boards			P48
	Product assurance and service system			P49

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www.toshiba-teli.co.jp/index.htm

Compatibility with optional parts and EMC conditions

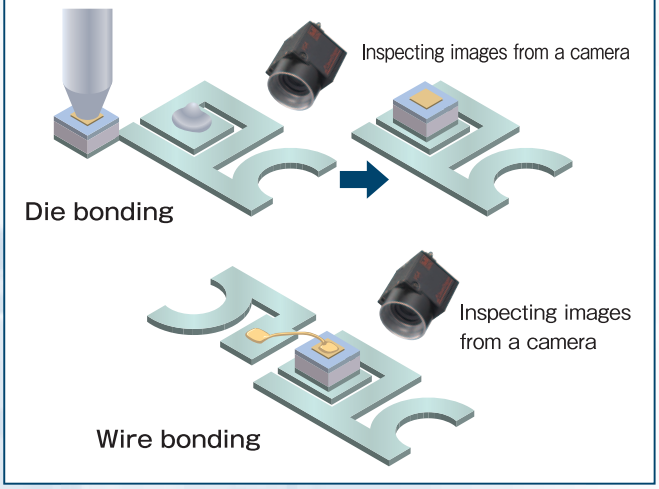
The customer is responsible for confirming final EMC compatibility for all systems and equipment when used with parts not specified by Toshiba Teli Corporation.

Essential for quality control

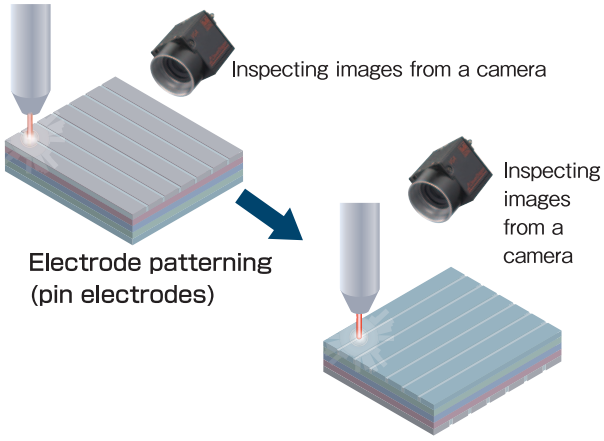
High performance cameras in a lineup to support a wide range of machine vision applications!
When high resolution is needed or when high frame rates are needed, Toshiba Teli's industrial cameras excel in a wide range of situations.

For Machinevision

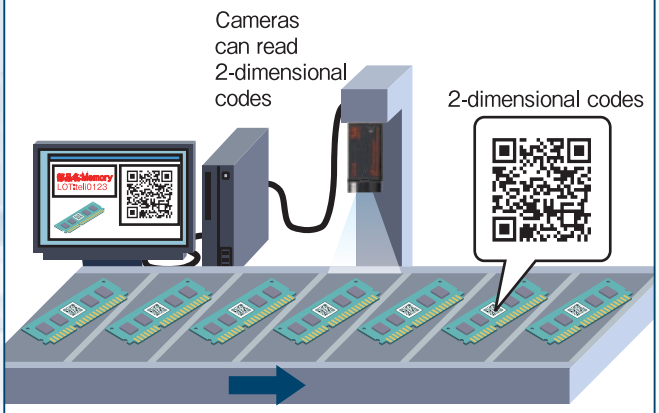
LED production processes (chip type) CASE 1



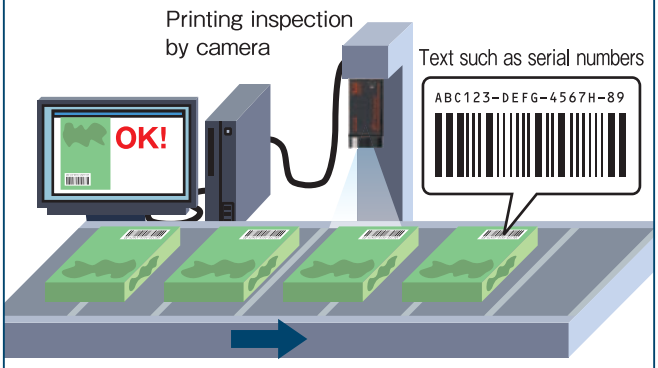
Solar power cell production processes CASE 2



Reading 2-dimensional codes CASE 3



Printing inspection CASE 4



Ever expanding fields of possibilities

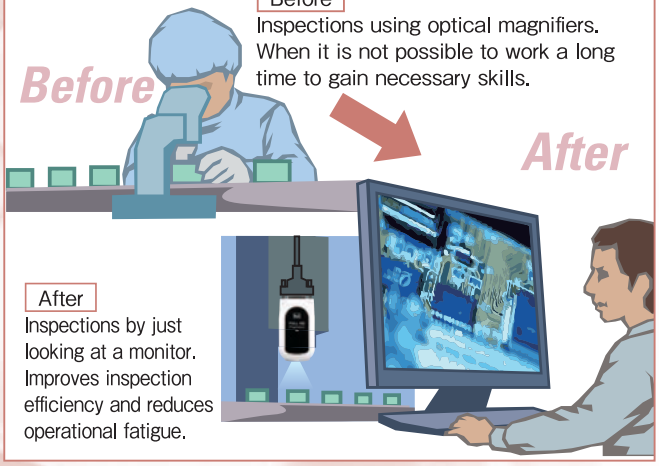
The need for industrial cameras is expanding beyond the range of machine vision. Outside the factory, there are applications such as using a camera rather than optical magnifiers for visual inspections, or combining cameras with microscopes for pathological examinations in conferences or presentations.
Toshiba Teli's cameras are being used for applications other than machine vision.

For Other Application

Inspecting circuit boards in a factory CASE 1

Before

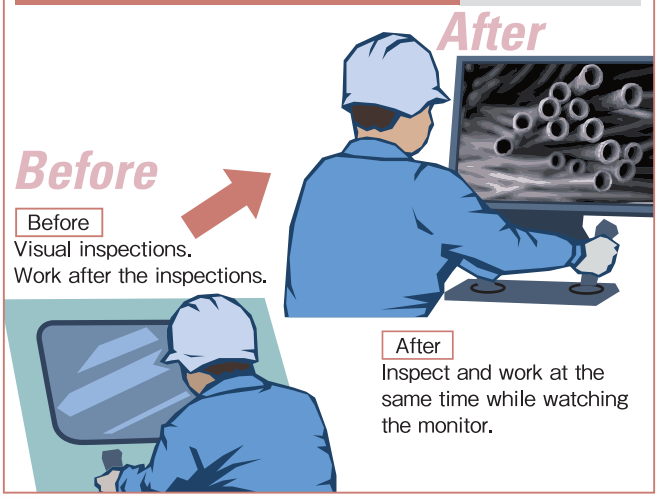
Inspections using optical magnifiers.
When it is not possible to work a long time to gain necessary skills.



After

Inspections by just looking at a monitor.
Improves inspection efficiency and reduces operational fatigue.

Defect inspection CASE 2



Before

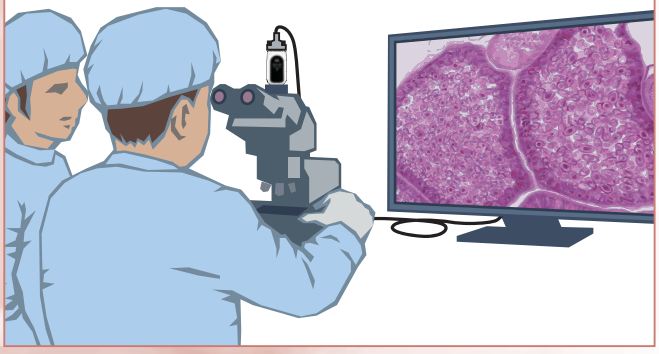
Visual inspections.
Work after the inspections.

After

Inspect and work at the same time while watching the monitor.

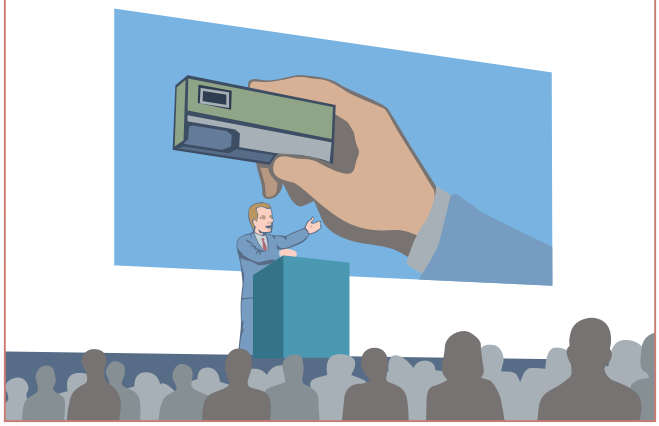
Monitor for pathological examination CASE 3

High resolution moving images can be watched in real time for excellent realism.



For conferences CASE 4

Real-life conditions can be expressed to audiences at conferences and other places.



BU Series

USB 3.0 camera series

BU Series

CCD | CMOS | USB 3.0 | Color RGB | B/W | 2M | VGA | XGA | SXGA | Progres-sive | 4M

New product

USB3 VISION™

Overview

BU series adopts the USB3.0 interface. It uses the USB 3.0 standard for image output and camera control, for high-speed processing of high-resolution video signals. Also the camera body is ultra compact and light,so it is suitable for incorporation into other devices even a small space.

Features

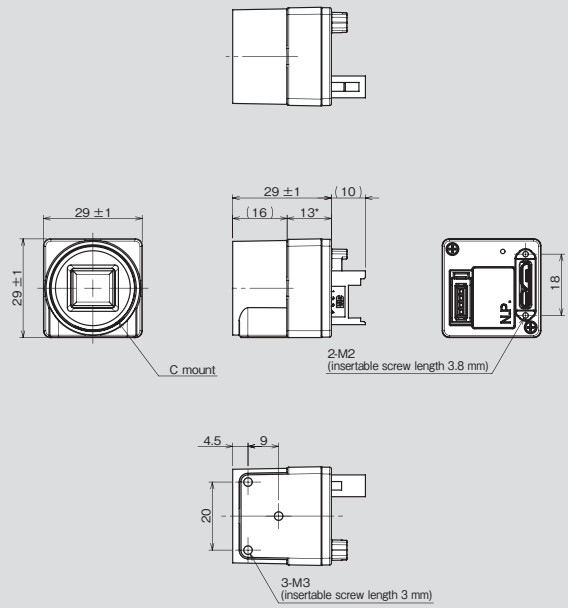
- ●High frame rate
- ●All pixel readout
- ●Full-frame shutter
- ●Square pixels
- ●USB 3.0 interface
- ●USB 3 Vision compliance scheduled
- ●Full 3 year warranty (BU/BG Series)

Accessory information (options)

- USB cable
- Lens (C-mount lens) ····· ▶ P36~P39
- Camera mounting kit (CPTBU)

● Connection example ▶ P40
● Spectral sensitivity characteristics ▶ P45~P46

Dimensions



*BU205M, BU406M, BU406MC/CF···16

Specifications

Item \ Model		BU031	BU030	BU080	BU130	*BU030C/CF	*BU130C/CF	**BU205M	*BU406M	**BU406MC/CF
Image sensor		1/2 type CCD ICX414AL	1/3 type CCD ICX424AL	1/3 type CCD ICX204AL	1/3 type CCD ICX445AL	1/3 type CCD ICX424AQ	1/3 type CCD ICX445AQ	2/3 type CMOS CMV2000	1/1 type CMOS CMV4000	1/1 type CMOS CMV4000
Maximum output image size		VGA	VGA	XGA	SXGA	VGA	SXGA	2M	4M	4M
Interface		USB3.0 (Super speed)								
Protocol		USB3 Vision								
Frame rate	45 MHz when driving	125 fps	125 fps	40 fps	30 fps	125 fps	30 fps	170 fps	90 fps	90 fps
Trigger shutter	Hardware trigger	Edge, pulse width control, positive/negative polarity								
	Software trigger	According to USB 3 Vision command								
Readout mode	All pixel readout	640 (H) x 480 (V)	640 (H) x 480 (V)	1024 (H) x 768 (V)	1280 (H) x 960 (V)	640 (H) x 480 (V)	1280 (H) x 960 (V)	2048 (H) x1088 (V)	2048 (H) x 2048 (V)	2048 (H) x 2048 (V)
Pixel size		9.9 (H) x 9.9 (V)	7.4 (H) x 7.4 (V)	4.65 (H) x 4.65 (V)	3.75 (H) x 3.75 (V)	7.4 (H) x 7.4 (V)	3.75 (H) x 3.75 (V)	5.5 (H) x 5.5 (V)	5.5 (H) x 5.5 (V)	5.5 (H) x 5.5 (V)
Pixel format		Mono8/Mono10				Bayer 8/Bayer 10 RGB 8 (24bit/pix) YUV411 (12bit/pix)/YUV422 (16bit/pix)		Mono 8		Bayer 8
GPIO	Connector	Sumitomo 3M 37204-62B3-004PL (e-con connector)								
	Input	1 circuit: TRIG, LVTTL input (Low : 0 to 0.5V, High : 2.0 to 24.0V)								
	Output	1 circuit : LVTTL output (2 circuits : 5V CMOS available, contact our sales division)				2 circuits : 5V CMOS output				
		pulse generator (strobe timing etc.)/EXPLOSURE_ACTIVE/FRAME_ACTIVE/FRAME_TRANSFER/FRAME_TRIGGER_WAIT switchable								
Power supply		DC+5V±10% (input from USB connector)								
Lens mount		C mount								
Dimensions		29 mm (W) × 29 mm (H) ×13 mm (D) (Not including mount and protrusions)						29 mm (W) × 29 mm (H) ×16 mm (D) (Not including mount and protrusions)		
Weight		Approx. 27 g						Approx. 32 g		
Ambient temperature		0° C to 40° C (temperature of case must be below 50° C)								
Applicable standards		CE, FCC, RoHS, USB3 Vision, GenICam, IIDC2								

*New release **plan to be added C ··· color type (IR cut filter non - implemented) CF ··· color type (IR cut filter implemented)

Access here for details about products!

Gig E (PoE) camera series

BG Series

CCD | PoE | Color RGB | B/W | VGA | XGA | SXGA | UXGA | Progres-sive

New product

GiGE VISION™

Overview

BG series adopts the power over Gigabit Ethernet® (PoE) interface. Ideal for high-speed, high-resolution image processing. BG series is the most suitable for replacement from analog camera, the reason of cable and size of body.

Features

- ●High frame rate
- ●All pixel readout
- ●Full-frame shutter
- ●Square pixels
- ●Gigabit Ethernet interface (Power supply type)
- ●Full 3 year warranty (BU/BG Series)

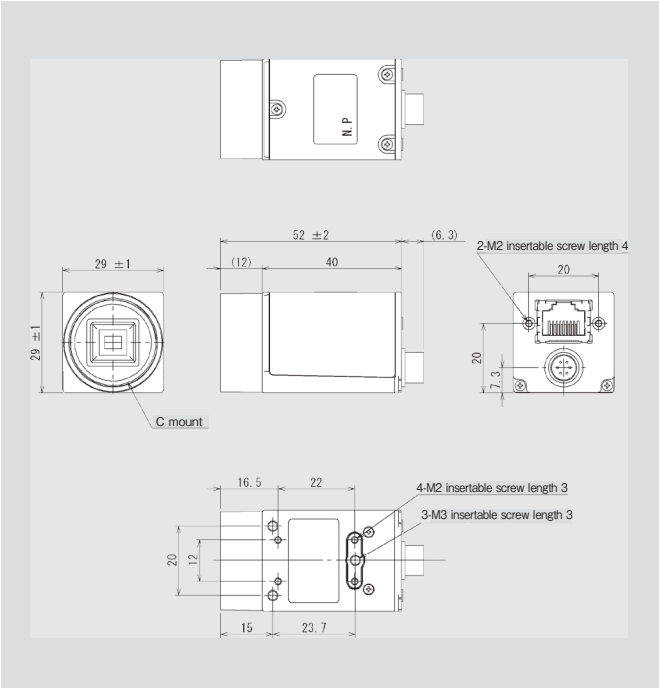
*Ethernet® is a registered trademark of Xerox.

Accessory information (options)

- LAN cable (category 5e or higher)
- Lens (C-mount lens) ····· ▶ P36~P39
- Camera mounting kit (CPT8600) ····· ▶ P34

● Connection example ▶ P40
● Pin assignment ▶ P47
● Spectral sensitivity characteristics ▶ P45~P46

Dimensions



Specifications

Item \ Model		BG031	BG030	BG080	BG130	*BG202	*BG030C/CF	*BG130C/CF	**BG202C/CF
Image sensor		1/2 type CCD ICX414AL	1/3 type CCD ICX424AL	1/3 type CCD ICX204AL	1/3 type CCD ICX445AL	1/1.8 type CCD ICX274	1/3 type CCD ICX424AQ	1/3 type CCD ICX445AQA	1/1.8 type CCD ICX274AQ
Maximum output image size		VGA	VGA	XGA	SXGA	UXGA	VGA	SXGA	UXGA
Interface		Gigabit Ethernet IEEE802.3ab (1000 BASE-T) compatible							
Protocol		GigEVision Ver 1.2							
Frame rate	45 MHz when driving	125 fps	125 fps	40 fps	30 fps	20 fps	125 fps	30 fps	20 fps
Trigger shutter	Hardware trigger	Edge, pulse width control, positive/negative polarity							
	Software trigger	According to GigE Vision command							
Readout mode	All pixel readout	640 (H) x 480 (V)	640 (H) x 480 (V)	1024 (H) x 768 (V)	1280 (H) x 960 (V)	1600 (H) x 1200 (V)	640 (H) x 480 (V)	1280 (H) x 960 (V)	1600 (H) x 1200 (V)
Pixel size		9.9 (H) X 9.9 (V)	7.4 (H) X 7.4 (V)	4.65 (H) X 4.65 (V)	3.75 (H) X 3.75 (V)	4.4 (H) X 4.4 (V)	7.4 (H) X 7.4 (V)	3.75 (H) X 3.75 (V)	4.4 (H) X 4.4 (V)
Pixel format		Mono8/Mono10					Bayer 8/Bayer 10 RGB 8 (24 bit/pix) YUV411 (12 bit/pix)/YUV422 (16 bit/pix)		
GPIO	Connector	HIROSE HR10A-7R-6PB (or equivalent product)							
	Input	1 circuit : TRIG photo coupler input							
	Output	LVTTL output : 1 circuit, photo coupler output : 1 circuit TIMER0_ACTIVE/EXPOSURE_ACTIVE/ FRAME_ACTIVE/FRAME_TRANSFER/FRAME_TRIGGER_WAIT switchable							
Power supply		PoE (input via RJ-45 connector)/DC +12 V ±10% (input via HIROSE connector)							
Lens mount		C mount							
Dimensions		29 (W) × 29 (H) ×40 (D) mm (Not including mount and protrusions)							
Weight		Approx. 53 g							
Ambient temperature		0° C to 40° C (temperature of case must be below 50° C)							
Applicable standards		CE, FCC, RoHS, GigE Vision, GenICam, PoE (IEEE802.3af)							

*New release **plan to be added C ··· color type (IR cut filter non - implemented) CF ··· color type (IR cut filter implemented)

Access here for details about products!

CSGV90BC3-B/CSGX36BC3-B/CSGS15BC23-B/CSGS
CSGV90CC3-B/CSGX36CC3-B/CSGS15BC23-B/CSGU

Gigabit Ethernet interface

GiGE VISION™

Overview

CSG series uses the Gigabit Ethernet® interface standard IEEE802.3ab so it is suitable for processing high-resolution images quickly.
Selection of frame rates, resolution, and color or black and white is available. The camera body is compact and light, so it is suitable for incorporation into other devices.

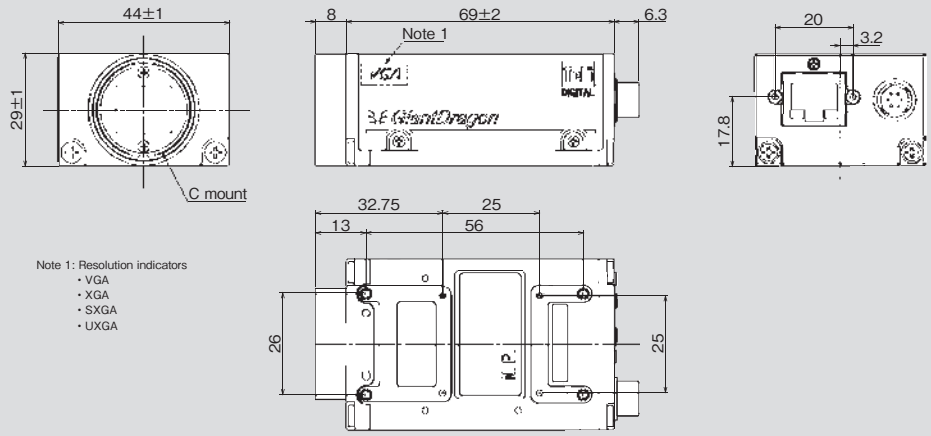
Features

- ●High frame rate
- ●All pixel readout
- ●Full-frame shutter
- ●Square pixels
- ●Gigabit Ethernet® interface
  Video output and camera control via the Gigabit Ethernet® standard IEEE802.3ab interface.
- ●GigEVision Ver 1.0 compliance
- ●GenICam Ver 1.0 compliance
- ●Random trigger shutter function
- ●Scalable
  Selectable video output area. This mode achieves higher frame rate by reducing vertical output area. And reduces occupied data rate of Gigabit Ethernet by reducing horizontal output area.
- ●Compact, lightweight
- ●Excellent vibration and shock resistance

*Ethernet® is a registered trademark of Xerox.

Dimensions

CSGV90BC3-B / CSGX36BC3-B / CSGS15BC23-B / CSGS20BC2-B / CSGU15BC18-B
/ CSGV90CC3-B / CSGX36CC3-B / CSGS20CC2-B / CSGU15CC18-B



Accessory information (options)

- LAN cable (category 5e or later)
- Power cable (CPC3910-XX) ····· ▶ P33
- Power supply adapter (CA130D) ····· ▶ P32
- Lens (C-mount lens) ····· ▶ P36~P39
- Camera mounting kit (CPT8420) ····· ▶ P34

● Connection example ▶ P40
● Pin assignment ▶ P47
● Spectral sensitivity characteristics ▶ P45~P46

Access here for details about products!

20BC2-B/CSGU15BC18-B 15CC18-B

CCD | Gig-E | Color RGB | B/W | Progressive | VGA | XGA | SXGA | UXGA

B/W camera specifications

Item \ Model	CSGV90BC3-B	CSGX36BC3-B	CSGS15BC23-B	CSGS20BC2-B	CSGU15BC18-B
Image sensor	All pixel readout interline CCD				
Effective pixels	659 (H) x 494 (V)	1034 (H) x 779 (V)	1392 (H) x 1040 (V)		1628 (H) x 1236 (V)
Scanning area	4.88 (H) mm × 3.66 (V) mm (1/3 type)	4.81 (H) mm × 3.62 (V) mm (1/3 type)	8.98 (H) mm × 6.71 (V) mm (2/3 type)	6.47 (H) mm × 4.84 (V) mm (1/2 type)	7.16 (H) mm × 5.44 (V) mm (1/1.8 type)
Pixel size	7.4 (H) μm × 7.4 (V) μm (square pixels)	4.65 (H) μm × 4.65 (V) μm (square pixels)	6.45 (H) μm × 6.45 (V) μm (square pixels)	4.65 (H) μm × 4.65 (V) μm (square pixels)	4.40 (H) μm × 4.40 (V) μm (square pixels)
Video output	Gigabit Ethernet IEEE802.3ab (1000 BASE-T) compatible				
Protocol	GigEVision Camera Interface Standard for Machine Vision Ver 1.0				
Scan system	Progressive				
Video format	GVSP_PIX_MONO8: MONO8bit/GVSP_PIX_MONO10: MONO10bit				
Frame rate	90 fps (Max)	36 fps (Max)	15 fps (Max)	20 fps (Max)	15 fps (Max)
Binning mode	1/2 240 line 170 fps (Max)	1/2 384 line 64 fps (Max)	1/2 512 line 32 fps (Max)	1/2 480 line 34 fps (Max)	1/4 300 line 46 fps (Max)
Sync system	Internal synchronization				
Internal synchronization	36.0000MHz±100ppm				
Aspect ratio	4:3				
Subject illumination	Standard: 600 lx, F5.6 1/90 s Min: 5 lx, F1.4 (gain maximum, all pixel readout, video output 50%)	Standard: 800 lx, F5.6 1/36 s Min: 7 lx, F1.4 (gain maximum, all pixel readout, video output 50%)	Standard: 400 lx, F11 1/15 s Min: 1.5 lx, F1.4 (gain maximum, all pixel readout, video output 50%)	Standard: 500 lx, F5.6 1/20 s Min: 4 lx, F1.4 (gain maximum, all pixel readout, video output 50%)	Standard: 400 lx, F8 1/15 s Min: 2 lx, F1.4 (gain maximum, all pixel readout, video output 50%)
Gain	0 to +12 dB (75 steps)				
Gamma	OFF (γ = 1.0 fixed)				
Trigger signal	Low: 0 to 0.5 V, High: 3.3 to 24.0 V, polarity positive/negative switching (initial setting: negative), pulse width minimum: 50 μs				
Electronic shutter	Preset settings: Select from 1/100 s, 1/250 s, 1/500 s, 1/1000 s, 1/2000 s, 1/4000 s, 1/10000 s, 1/20000 s; Absolute value setting: 1/20000 to 2 s				
Power supply	DC 12 V ± 10% (ripple 100 mVp-p or less)				
Power consumption	3.5 W (max)				
Lens mount	C-mount				
Dimensions	44 (W) × 29 (H) × 69 (D) mm (not including protrusions)				
Weight	Approx. 120 g				
Regulations	CE, FCC				

Color camera specifications

Item \ Model	CSGV90CC3-B	CSGX36CC3-B	CSGS20CC2-B	CSGU15CC18-B
Image sensor	All pixel readout interline CCD			
Effective pixels	659 (H) x 494 (V)	1034 (H) x 779 (V)	1392 (H) x 1040 (V)	1628 (H) x 1236 (V)
Scanning area	4.88 (H) mm × 3.66 (V) mm (1/3 type)	4.81 (H) mm × 3.62 (V) mm (1/3 type)	6.47 (H) mm × 4.84 (V) mm (1/2 type)	7.16 (H) mm × 5.44 (V) mm (1/1.8 type)
Pixel size	7.4 (H) μm × 7.4 (V) μm (square pixels)	4.65 (H) μm × 4.65 (V) μm (square pixels)	4.65 (H) μm × 4.65 (V) μm (square pixels)	4.40 (H) μm × 4.40 (V) μm (square pixels)
Video output	Gigabit Ethernet IEEE802.3ab (1000 BASE-T) compatible			
Protocol	GigEVison Camera Interface Standard for Machine Vision Ver1.0			
Scan system	Progressive			
Video format	GVSP_PIX_YUV411_PACKED: YUV4:1:1 12bit GVSP_PIX_YUV422_PACKED: YUV4:2:2 16bit GVSP_PIX_RGB8_PACKED: RGB 24bit			
	GVSP_PIX_BAYRG8 Raw (BayRG8) 8bit GVSP_PIX_BAYRG10 Raw (BayRG10) 10bit	GVSP_PIX_BAYGB8 Raw (BayGB8) 8bit GVSP_PIX_BAYGB10 Raw (BayGB10) 10bit		GVSP_PIX_BAYRG8 Raw (BayRG8) 8bit GVSP_PIX_BAYRG10 Raw (BayRG10) 10bit
Frame rate	90 fps (Max)	36 fps (Max)	20 fps (Max)	15 fps (Max)
Draft mode	—	1/3 254 lines 86 fps	1/2 480 lines 34 fps	1/4 300 lines 46 fps
Sync system	Internal synchronization			
Internal synchronization	36.0000MHz±100ppm			
Aspect ratio	4:3			
Subject illumination	Standard: 1700 lx, F5.6 5000 K 1/90 s Min: 20 lx, F1.4 (gain maximum, all pixel readout, video output 50%)	Standard: 2400 lx, F5.6 5000 K 1/36 s Min: 27 lx, F1.4 (gain maximum, all pixel readout, video output 50%)	Standard: 1400 lx, F5.6 5000 K 1/20 s Min: 18 lx, F1.4 (gain maximum, all pixel readout, video output 50%)	Standard: 1000 lx, F8 5000 K 1/15 s Min: 7 lx, F1.4 (gain maximum, all pixel readout, video output 50%)
Gain	0 to +6 dB (38 steps)			
Gamma	(γ = 0.65) ON/OFF (γ = 1.0) switching			
White balance	Manual: 2500 K to 6500 K, R and B gain can be set independently/One push auto white balance: 2500 K to 6500 K			
Trigger signal	Low: 0 to 0.5 V, High: 2.0 to 24.0 V, polarity positive/negative switching (initial setting: negative), pulse width minimum: 50 μs			
Electronic shutter	Preset settings: Select from 1/100 s, 1/250 s, 1/500 s, 1/1000 s, 1/2000 s, 1/4000 s, 1/10000 s, 1/20000 s; Absolute value setting: 1/20000 to 2 s			
Power supply	DC 12 V ± 10% (ripple 100 mVp-p or less)			
Power consumption	3.5 W (max)			
Lens mount	C-mount			
Dimensions	44 (W) × 29 (H) × 69 (D) mm (not including protrusions)			
Weight	Approx. 120 g			
Regulations	CE, FCC			

CSCLV90BC3

CCD | PoCL lite | B/W | Progres-sive | VGA

20 mm cube ultra-compact B/W camera

PoCL LITE

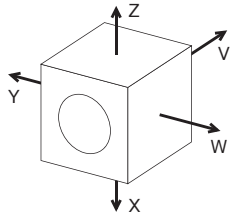
Overview

The CSCLV90BC3 Series of products are integral mono-chrome cameras incorporating a VGA-compatible interline CCD that reads out all pixels.
These cameras have achieved high speed by tripling the drive frequency of conventional CCD cameras. The camera body is ultra compact and light, so it is suitable for incorporation into other devices.

Specifications

Item \ Model	CSCLV90BC3
Image sensor	All pixel readout interline CCD
Effective pixels	659 (H) x 494 (V)
Scanning area	4.88 mm (H) × 3.66 mm (V) (1/3 type)
Pixel size	7.4 μm × 7.4 μm (square pixels)
Scan system	Progressive
Sync system	Internal synchronization
Aspect ratio	4:3
Video output	Camera link version 1.2 compatible
Readout mode	Data: 10/8 bit switching All pixel readout: 648 (H) × 494 (V) [Approx. 90 fps] Partial readout: 648 (H) × 120 to 494 (V) [Approx. 94.8 to 290.3 fps] Minimum width: 120 lines, steps: 1 lines
Subject illumination	Standard: 600 lx, F5.6 (Gain: Fix) Min: 6 lx, F1.4 (Gain: 10 dB, approximate video output 50%)
Internal sync signal	36.00 MHz (1 CLK) ±100 ppm Sync frequency: 46.153 kHz (H) (1 H = 780 CLK) Vertical synchronizing frequency: 92.4 Hz (V) (maximum speed for normal shutter)
Gain	0 to approx. +12 dB [1 step = approx. 0.1 dB]
Gamma	OFF (γ = 1.0 fixed)
Trigger signal	Camera Link interface input CC1 Polarity positive/negative switching, pulse width: 2 μs (min)
Electronic shutter	8/1 to 1/20,000 [sec]
Power supply	DC 12 V ±10% (ripple 50 mVp-p or less)
Power consumption	Approx. 1.3 W
Lens mount	M10.5 P0.5 female
Dimensions	20 mm (W) × 20 mm (H) × 20 mm (D) (not including protrusions)
Weight	Approx. 20 g
Regulations	CE, FCC

Connector outlet direction



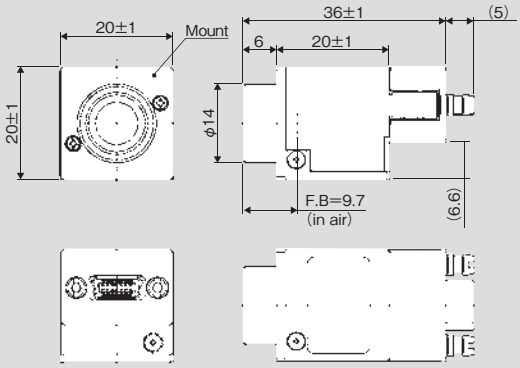
CSCLV90BC3V V : Rear [Default]
CSCLV90BC3W W : Left
CSCLV90BC3X X : Bottom
CSCLV90BC3Y Y : Right
CSCLV90BC3Z Z : Top

Features

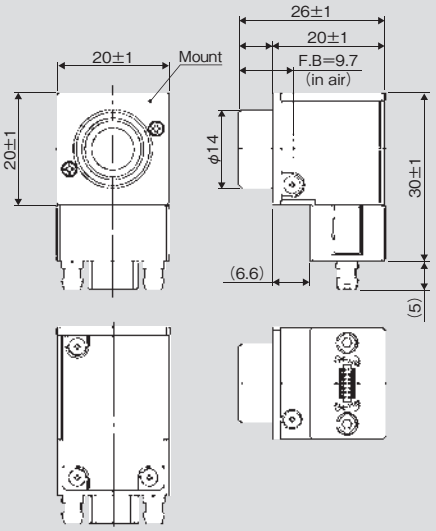
- Ultra-compact, lightweight
- 3x readout rates
- All pixel readout
- Features PoCL-Lite interface

Dimensions

CSCLV90BC3V



CSCLV90BC3X



Accessory information (options)

- PoCL-Lite cable
  (Varies depending on the grabber board connected)
- Lens (M10.5 P0.5 female threading) ▶ P36~P39
- PoCL-Lite compatible board ▶ P48
- Camera mounting kit (CPT8531A) ▶ P34

● Connection example ▶ P40
● Pin assignment ▶ P47
● Spectral sensitivity characteristics ▶ P45~P46

Access here for details about products!

CSCV125CC3 [Color]
CSCV125BC3 [Black & white]

CCD | PoCL | Color RGB | B/W | Progressive | VGA

VGA 4x speed camera

Overview

These cameras use the VGA-format-compatible all-pixel-readout interline CCD. These cameras have achieved high speed by quadrupling the drive frequency of conventional CCD cameras. Ideal for high-speed, high-resolution image processing.
Also, the camera body is compact and light, so it is suitable for incorporation into other devices.

Specifications

Item \ Model	CSCV125BC3	CSCV125CC3
Image sensor	All pixel readout interline CCD	
Effective pixels	659 (H) x 494 (V)	
Scanning area	4.88 mm (H) × 3.66 mm (V) (1/3 type)	
Pixel size	7.4 μm × 7.4 μm (square pixels)	
Color filter	—	R, G, B primary color mosaic on-chip color filter
Scan system	Progressive	
Sync system	Internal synchronization	
Aspect ratio	4:3	
Video output	Camera link version 1.2 compatible	
Readout mode	Data: 10/8 bit switching (Initial setting: 8 bit) All pixel readout: 648 (H) × 494 (V) [Approx. 126.2 fps] Partial readout: 648 (H) × 120 to 480 (V) [Approx. 129.5 to 395.8 fps] Minimum width: 120 lines, steps: 1 lines	Data: RGB 24 bit/raw 10 bit/raw 8 bit switching (Initial setting: RGB 24 bit) All pixel readout: 640 (H) × 480 (V) [Approx. 127.7 fps] Partial readout: 640 (H) × 120 to 480 (V) [Approx. 127.7 to 378.6 fps] Minimum width: 120 lines, steps: 2 lines
Subject illumination	Standard: 850 lx, F5.6 (Gain: Fix) Minimum: 8 lx, F1.4 (Gain: 10 dB, approximate video output 50%)	Standard: 2400 lx, F5.6 (Gain: Fix) Minimum: 20 lx, F1.4 (Gain: 18 dB, approximate video output 50%)
Internal sync signal	49.090902 MHz (1 CLK) ±100 ppm Horizontal sync frequency: 62.937 kHz (1 H = 780 CLK) Vertical sync frequency: 126.26 Hz (maximum speed for normal shutter)	49.090902 MHz (1 CLK) ±100 ppm Horizontal sync frequency: 62.937 kHz (1 H = 780 CLK) Vertical sync frequency: 127.66 Hz (maximum speed for normal shutter)
Gain	-6 to approx. +18 dB [1 step = approx. 0.1 dB]	
Gamma	OFF (γ = 1.0)	ON / OFF [Initial setting: OFF] *Disabled (OFF) at the time of raw data output (8/10bit)
White balance	—	Manual/one push auto *Disabled (OFF) at the time of raw data output (8/10bit)
Trigger signal	Camera Link interface input CC1 Polarity positive/negative switching, pulse width: 2 μs (min)	
Electronic shutter	Shutter speed 8/1 to 1/100,000 [sec]	
Power supply	DC12V ±10% (ripple 50mVp-p or less)	
Power consumption	Approx. 1.8 W	
Lens mount	C mount	
Dimensions	29 mm (W) × 29 mm (H) × 26.5 mm (D) (not including protrusions)	
Weight	Approx. 40 g	
Regulations	CE, FCC	

Features

●4x read rates
These cameras read out images four times faster than conventional CCD cameras.

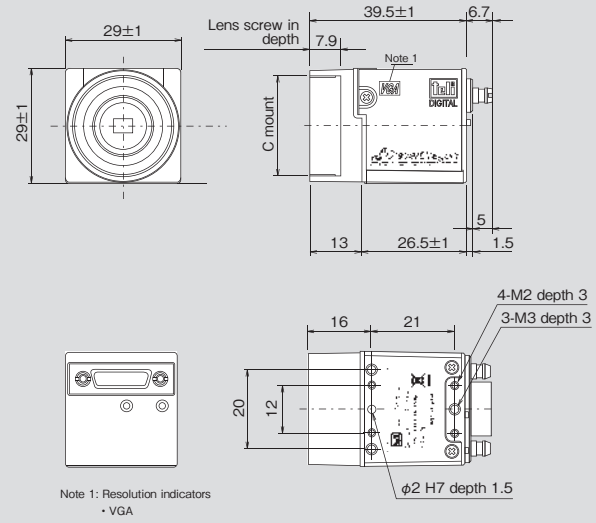
●All pixel readout
These cameras read out all pixels in about 1/125 sec, using the all pixel independent readout mode. Can read all pixels even while shutter is operating, equipped with full frame shutter.

●CameraLink interface (Power over CameraLink)
By using the CameraLink compatible frame grabber board that can supply power, it is possible to do high-speed transfer of images to your PC and to perform various camera controls from your PC, and also to supply power to the camera through a single cable.

●Ultra-compact, lightweight
Camera body is compact to save space, and it has excellent vibration and shock resistance.

Dimensions

CSCV125BC3 / CSCV125CC3



Accessory information (options)

- Camera link cable (SDR-XXX, PoCL compatible)
  (Varies depending on the grabber board connected)
- Lens (C-mount lens) ····· ▶ P36~P39
- PoCL compatible board ····· ▶ P48
  ⇒ Contact a sales representative for more information.
- Camera mounting kit (CPT8560) ····· ▶ P34

● Connection example ▶ P40
● Spectral sensitivity characteristics ▶ P45~P46

Access here for details about products!

CSCV90BC3/CSCX30BC3 CSCS20BC2/CSCU15BC18

CCD CL B/W Progressive
VGA XGA SXGA UXGA

CameraLink interface

PoCL

Overview

CameraLink black and white camera is compact and integrated with VGA to UXGA.

Features

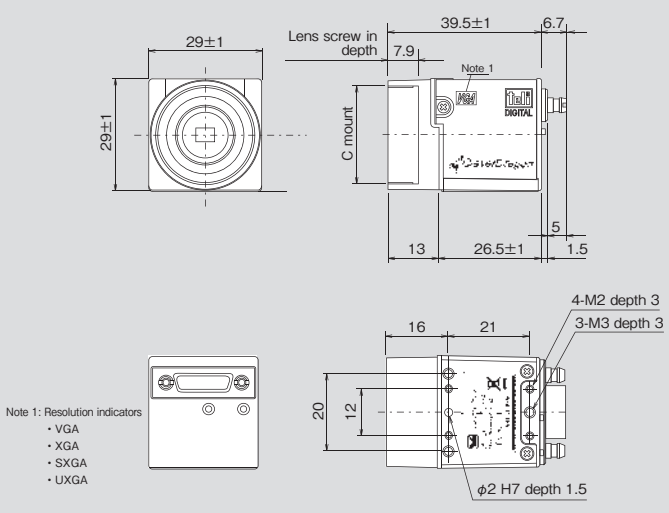
- All pixel readout
- Full-frame shutter
- Square pixels
- CameraLink Interface
- Random trigger shutter function
- Programmable partial readout mode
- Restart/reset
- Ultra-compact, lightweight

Specifications

Item \ Model	CSCV90BC3	CSCX30BC3	CSCS20BC2	CSCU15BC18
Image sensor	All pixel readout interline CCD			
Effective pixels	659 (H) x 494 (V)	1034 (H) x 779 (V)	1392 (H) x 1040 (V)	1628 (H) x 1236 (V)
Scanning area	4.88 mm (H) × 3.66 mm (V) (1/3 type)	4.81 mm (H) × 3.62 mm (V) (1/3 type)	6.47 mm (H) × 4.84 mm (V) (1/2 type)	7.16 mm (H) × 5.44 mm (V) (1/1.8 type)
Pixel size	7.4 μm × 7.4 μm (square pixels)	4.65 μm × 4.65 μm (square pixels)	4.65 μm × 4.65 μm (square pixels)	4.4 μm×4.4 μm (square pixels)
Scan system	Progressive			
Sync system	Internal synchronization			
Aspect ratio	4:3			
Video output	Camera Link (PoCL/non-PoCL)			
Readout mode	Data: 10/8 bit switching			
	All pixel readout: 648 (H) × 494 (V) [Approx. 92.4 fps]	All pixel readout: 1024 (H) × 768 (V) [Approx. 29.99 fps]	All pixel readout: 1360 (H) × 1024 (V) [Approx. 19.5 fps]	All pixel readout: 1616 (H) × 1200 (V) [Approx. 15.0 fps]
Subject illumination	Standard: 600 lx, F5.6, minimum: 6 lx F1.4 (Gain: 10 dB, approximate 50% video output)	Standard: 400 lx, F5.6, minimum: 4 lx F1.4 (Gain: 10 dB, approximate 50% video output)	Standard: 500 lx, F5.6, minimum: 5 lx F1.4 (Gain: 10 dB, approximate 50% video output)	Standard: 200 lx, F5.6, minimum: 2 lx F1.4 (Gain: 10 dB, approximate 50% video output)
Internal sync signal	36.000 MHz (1CLK) ± 100ppm Horizontal sync: 46.153 kHz (1 H = 780 CLK) Vertical sync: 92.4 Hz (maximum frequency for normal shutter)	29.50 MHz (1CLK) ± 100ppm Horizontal sync: 23.22 kHz (1 H = 1270 CLK) Vertical sync: 29.99 Hz (maximum frequency for normal shutter)	36.00 MHz (1CLK) ± 100ppm Horizontal sync: 20.11 kHz (1 H = 1790 CLK) Vertical sync: 19.49 Hz (maximum frequency for normal shutter)	36.00 MHz (1CLK) ± 100ppm Horizontal sync: 18.750 kHz (1 H = 1920 CLK) Vertical sync: 15.48 Hz (maximum frequency for normal shutter)
Gain	0 to approx. +12 dB [1 step = approx. 0.132 dB]			
Gamma	OFF (γ = 1.0 fixed)			
Trigger signal	CameraLink I/F input CC1, polarity positive/negative switching, pulse width: 2 μs (min)			
Electronic shutter	Shutter speed 8/1 to 1/20,000 [sec]		Shutter speed 2/1 to 1/20,000 [sec]	
Power supply	DC 12 V ±10% (ripple 50 mVp-p or less)			
Power consumption	Approx. 1.6 W	Approx. 1.3 W	Approx. 1.8 W	
Lens mount	C mount			
Dimensions	29 (W) × 29 (H) × 26.5 (D) mm (not including protrusions)			
Weight	Approx. 45 g			
Regulations	CE, FCC (PoCL only)	CE, FCC	CE, FCC (PoCL only)	CE, FCC

Dimensions

CSCV90BC3 / CSCX30BC3 / CSCS20BC2 / CSCU15BC18



Accessory information (options)

- Camera link cable (SDR-XXX, PoCL compatible)
  (Varies depending on the grabber board connected)
- Lens (C-mount lens) ▶ P36~P39
- PoCL compatible board ▶ P48
- Camera mounting kit (CPT8560) ▶ P34

● Connection example ▶ P40
● Pin assignment ▶ P47
● Spectral sensitivity characteristics ▶ P45~P46

Access here for details about products!

CSCU30BC18
CSCU30CC18

CCD | CL | Color RGB | B/W | Progressive | UXGA

CameraLink interface

Features

- All pixel readout
- Full-frame shutter
- Square pixels
- CameraLink interface (Power over CameraLink)
- Random trigger shutter function
- Restart/reset
- Partial readout function

Overview

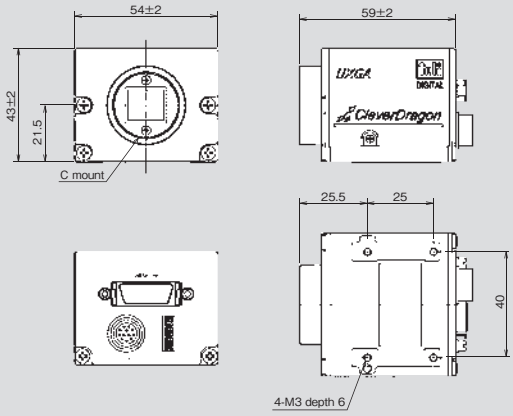
2 megapixels, 30 fps color/black and white CameraLink compatible camera

Specifications

Item \ Model	CSCU30BC18	CSCU30CC18
Image sensor	All pixel readout interline CCD	
Effective pixels	1628 (H) x 1236 (V)	
Scanning area	7.16 mm (H) × 5.44 mm (V) (1/1.8 type)	
Pixel size	4.4 μm (H) × 4.4 μm (V) (square pixels)	
Scan system	Progressive	
Sync system	Internal synchronization	
Aspect ratio	4:3	
Video output	CameraLink (PoCL type)	
Readout mode	Data: 12/10/8 bit switching	RGB 24 bit/RAW (12/10/8 bit) switching
	All pixel output: 1628 (H) × 1236 (V) [Approx. 30 fps]	
Subject illumination	Standard: 600 lx, F5.6 3000 K Min: 6 lx, F1.4 (Gain: Max, approximate 50% video output)	Standard: 2400 lx, F8 5000 K Minimum: 35 lx, F1.4 (Gain: Max, approximate 50% video output)
Internal sync signal	72.000 MHz, all pixel readout Horizontal sync: 37.500 kHz/Vertical sync: 30.000 Hz	
Gain	0 to +12 dB [150 steps]	0 to +6 dB [76 steps]
Gamma	OFF (γ = 1.0 fixed)	ON/OFF switching
White balance	—	Manual/one push auto white balance User Manual (R/B gain) setting/preset setting (6 data)
Trigger signal	CameraLink I/F input and I/O connector input Polarity positive/negative switching, pulse width: more than 26.7 μs	
Electronic shutter	ON/OFF switching, all pixel readout Shutter speed:1/30 to 1/65,934 [sec] (1250 steps)	
Power supply	DC 12 V ±10% (ripple 50 mVp-p or less)	
Power consumption	Approx. 4.5 W	
Lens mount	C mount	
Dimensions	54 (W) x 43 (H) x 59 (D) mm (*Including 8 mm lens mount)	54 (W) x 43 (H) x 59 (D) mm
Weight	Approx. 170 g	Approx. 175 g
Regulations	CE, FCC	

Dimensions

CSCU30BC18 / CSCU30CC18



Accessory information (options)

- CameraLink cable (MDR-XXX, PoCL compatible)
  (Varies depending on the grabber board connected)
- Lens (C-mount lens) ▶ P36~P39
- PoCL compatible board ▶ P48
- Camera mounting kit (CPT4000CL) ▶ P34

● Connection example ▶ P40
● Pin assignment ▶ P47
● Spectral sensitivity characteristics ▶ P45~P46

Access here for details about products!

CSCQS15BC23/CSCQS9CC23 CSCQS15CC23

CCD | CL | Color RGB | B/W | Progressive | QSXGA

CameraLink interface

CAMERA Link

Accessory information (options)

- CameraLink cable (MDR-XXX)
  (Varies depending on the grabber board connected)
- Power cable (CPRC3700-XX) ▶ P33
- Power supply adapter (CA130D) ▶ P32
- Lens (C-mount lens) ▶ P36~P39
- Camera link board ▶ P48
- Camera mounting kit (CPT4000CL (B/W) and CPT4000F (color) ▶ P34

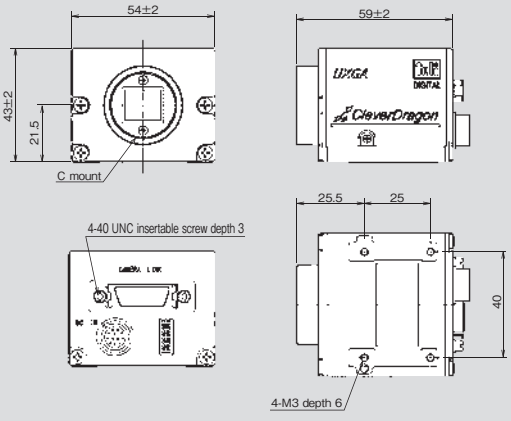
● Connection example ▶ P40
● Pin assignment ▶ P47
● Spectral sensitivity characteristics ▶ P45~P46

Specifications

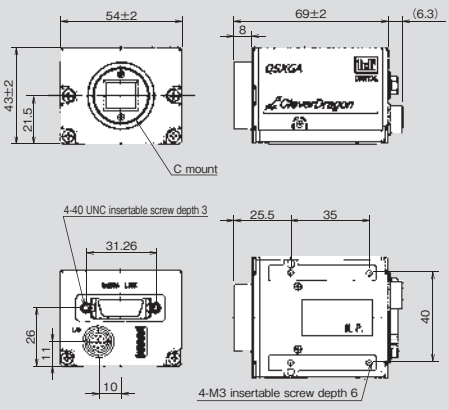
Item \ Model	CSCQS15BC23	CSCQS9CC23	CSCQS15CC23
Image sensor	All pixel readout interline CCD		
Effective pixels	2456 (H) x 2058 (V)		
Scanning area	8.47 mm (H) × 7.1 mm (V) (2/3 type)		
Pixel size	3.45 μm × 3.45 μm (square pixels)		
Scan system	Progressive		
Sync system	Internal synchronization		
Aspect ratio	6:5		
Video output	Camera Link (PoCL/non-PoCL)		
Readout mode	Data: 12/10/8 bit switching	RGB 24 bit/raw (12/10/8 bit) switching	
	All pixel readout: 2456 (H) × 2058 (V) [Approx. 15 fps]	All pixel readout: 2448 (H) × 2058 (V) [Approx. 9.3 fps]	All pixel readout: 2448 (H) × 2058 (V) [Approx. 15 fps]
Subject illumination	Standard: 400 lx, F5.6, 3000 K; minimum: 6.25 lx F1.4 (Gain: Max, approximate 50% video output)	Standard: 2200 lx, F8 5000 K; minimum: 9 lx F1.4 (Gain: Max, approximate 50% video output)	Standard: 1800 lx, F8 5000 K; minimum: 14 lx F1.4 (Gain: Max, approximate 50% video output)
Internal sync signal	60.000 MHz, all pixel readout Horizontal sync: 31.185 kHz (H)/15.104 Hz (V)	49.0909 MHz, all pixel readout Horizontal sync:19.21 kHz/vertical sync: 9.30 Hz	80.000 MHz, all pixel readout Horizontal sync: 31.185 kHz/vertical sync: 15.09 Hz
Gain	0 to +12 dB [121 steps]	0 to +6 dB [61 steps]	
Gamma	OFF (γ = 1.0 fixed)	ON/OFF switching	
White balance	—	Manual/one push auto white balance User Manual (R/B gain) setting/preset setting (6 data)	
Trigger signal	CameraLink I/F and I/O connector input Polarity positive/negative switching, pulse width: more than 30.1 μs	TRIG/VD Camera Link interface, I/O connector input Polarity positive/negative switching, pulse width: more than 52.1 μs	
Electronic shutter	ON/OFF switching, shutter speed 2/1 to 1/20,000 S		
Power supply	DC 12 V ±10% (ripple 50 mVp-p or less)		
Power consumption	Approx. 4.0 W	Approx. 4.6 W	Approx. 4.8 W
Lens mount	C mount		
Dimensions	54 (W) x 43 (H) x 59 (D) mm (*Including 8 mm lens mount)	54 (W) x 43 (H) x 69 (D) mm	
Weight	Approx. 180 g	Approx. 190 g	
Regulations	CE, FCC	CE, FCC (non-PoCL only)	

Dimensions

CSCQS15BC23



CSCQS9CC23 / CSCQS15CC23



Access here for details about products!

CSC6M85BMP11

CMOS | CL | B/W | Progressive | 6.5M

6.5 M B/W camera

New product

Overview

This camera equips a High-resolution B/W 6.55 megapixels readout system CMOS sensor.

Specifications

Item \ Model	CSC6M85BMP11
Image sensor	CMOS image sensor
Effective pixels	2560 (H) x 2560 (V)
Scanning area	12.8 mm (H) × 12.8 mm (V) (1.1 type)
Pixel size	5 μm (H) × 5 μm (V) Square pixels
Scan system	Progressive
Sync system	Internal synchronization
Aspect ratio	1:1
Camera I/F	CameraLink Full configration
	8 bit × 8 tap @ 72 MHz, can switch between PoCL type and non-PoCL type
Video output	・Data 8/10 bit switching (Factory setting: 8 bit) ・Readout mode (Full configuration, 8tap, 8bit, Shutter OFF) All pixel readout Approx. 85 fps/2560 (H) x 2560 (V) Binning(2x2) Approx. 170 fps/1280 (H) x 1280 (V) Binning(4x4) Approx. 340 fps/640 (H) x 640 (V)
Output mode	Full configuration 8 tap 72 MHz Medium configuration 4 tap 72 MHz Base configuration 2 tap 72 MHz (Factory setting: Full configuration)
Sensitivity	Standard: 470 lx, F5.6, 3000 K (Shutter speed: 1/60 sec)
	12 lx (F2.8, GAIN MAX, Shutter speed: 1/60 sec, reading all pixels, gamma function: 16, video level: 50%)
Gain	0 ~ 18dB
Gamma	OFF (γ = 1.0)/LUT for user settings
Trigger signal	Camera Link CC1 or round connector, TTL level
Electronic shutter	ON/OFF switching, random trigger shutter mode
Power supply	DC12V±10%
Power consumption	Approx. 3.36 W
Lens mount	C mount
Dimensions	40 mm (W) × 40 mm (H) × 35 mm (D) (not including protrusions)
Weight	Approx. 100 g
Regulations	CE, FCC

*The specifications and external appearance are subject to change without notice.
*Color type CSC6M85CMP11 plan to be added.

Accessory information (options)

- CameraLink cable
  (SDR-XXX, *PoCL compatible products for full configuration)
  *Varies depending on the grabber board
- Lens (c-mount lens*) ▶ P36~P39
  *1.1 type lens recommended
- CameraLink board
  ⇒ Contact a sales representative about support boards.
- Camera mounting kit (CPT6M)
  ⇒ Contact a sales representative for information.

● Connection example ▶ P40
● Pin assignment ▶ P47

Features

●High-speed output of ultra-high-definition images
The TOSHIBA TELI's proprietary 1.1 type 6.55 megapixels High-resolution B/W CMOS sensor outputs the entire 6.55 megapixels in a speed as high as 85 fps.

●Global shutter
A global electronic shutter similar to a CCD image sensor, clear images of even fast-moving object are obtainable with less blur.

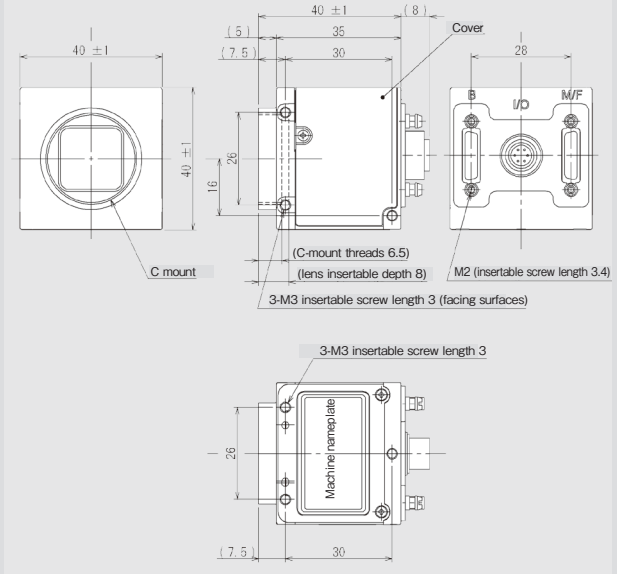
●High-sensitivity
As sensitive as CCD camera.

●Binning function
By using Binning function, it is possible to change resolution without change field of view.

●WOI function
Partial readout is possible by using WOI function.

Dimensions

CSC6M85BMP11



Access here for details about products!

CSC12M25CMP19 [Color]
CSC12M25BMP19-01B [Black & White]

CMOS | CL | Color raw | B/W | Progressive | 12M

Ultra-High precision [12M] High frame rate [25fps] B/W camera

Specifications

Item \ Model	CSC12M25BMP19-01B	CSC12M25CMP19
Image sensor	CMOS monochrome image sensor	CMOS image sensor
Effective pixels	4096 (H) x 3072 (V)	
Scanning area	24.6 mm (H) × 18.5 mm (V) (1.9 type)	
Pixel size	6 μm (H) × 6 μm (V)	
Color filter	—	R, G, B primary color mosaic on-chip color filter
Scan system	Progressive	
Sync system	Internal synchronization	
Aspect ratio	4:3	
Video output	CameraLink compatible (non-PoCL)	
Readout mode	Data 10/8 bit switching All pixel readout: 4096 (H) × 3072 (V) [Approx. 25 fps] Binning mode: 2048 (H) × 1536 (V) [Approx. 41.8 fps] Sub-sampling (8×8): 512 (H) × 384 (V) [Approx. 200 fps] (Medium configuration, shutter OFF mode)	RAW 8 bit/RAW 10 bit switching All pixel readout: 4096 (H) × 3072 (V) [Approx. 25 fps] (Medium configuration, 10 bit, shutter OFF mode)
Subject illumination	Standard: 2000 lx, F5.6 3000 K Min: 30 lx, F2.8 (Gain maximum, approximate 50% video output)	Standard: 3000 lx, F4 5000 K Min: 125 lx, F2.8 (Gain maximum, all pixel readout, approximate 50% video output)
Internal sync signal	All pixel readout Horizontal: Approx. 75 kHz Vertical: Approx. 25 Hz Binning Horizontal: Approx. 54 kHz Vertical: Approx. 43.5 Hz Sub-sampling Horizontal: Approx. 75 kHz Vertical: Approx. 50 to 200 Hz *Medium configuration, shutter OFF mode	All pixel readout Horizontal: Approx. 75 kHz Vertical: Approx. 25 Hz *Medium configuration, shutter OFF mode WOI: According to window setting
Gain	0 to +18 dB (180 steps)	
Gamma	OFF (γ=1.0)	
White balance	—	Manual/one push auto
Trigger signal	TTL	
Electronic shutter	1/20,000 to 2 sec. ON/OFF switching	
Power supply	DC12 V ± 10 %	
Power consumption	Approx. 5.4 W	
Lens mount	TFL-II mount (Toshiba Teli original) F-mount lens can be used with mount conversion adapter FTAR-2 (option)	
Dimensions	75 mm (W) × 75 mm (H) × 69.5 mm (D) (not including protrusions)	
Weight	Approx. 450 g	
Regulations	CE, FCC	

Accessory information (options)

- CameraLink cable (MDR-XXX)
  (Varies depending on the grabber board connected)
- Power cable (CPRC3700-XX) ▶ P33
- Power supply adapter (CA130D) ▶ P34
- Lens (TFL-II mount lens) ▶ P36~P39
- F mount conversion adapter (FTAR-2)
  ⇒Contact a sales representative for more information
- Camera link board ▶ P48
- Camera mounting kit (CPTC12M) ▶ P34

● Connection example ▶ P40
● Pin assignment ▶ P47
● Spectral sensitivity characteristics ▶ P45~P46

Overview

Incorporating a 1.9 type, 12.58 megapixel CMOS progressive scan sensor developed by Toshiba Teli, this camera offers ultra-high resolution and high frame rates.

Features

●High-speed output of ultra-high-definition images
12.58 megapixel images are output at a speed of 25 fps in raw/black & white output mode.

●WOI (Window of Interest)
Variable frame rates are supported, allowing even higher frame rates by reading pixels only in areas specified using horizontal and vertical addresses.

●Global shutter
Like the CCD image sensor models, the camera incorporates a digital global shutter to achieve sharp clear images, even for fast-moving subjects.

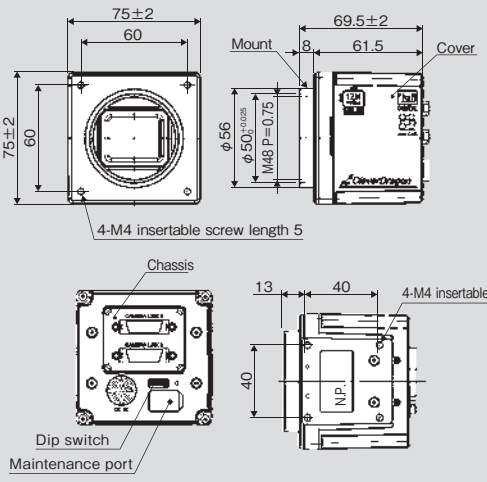
●Random trigger shutter function
Allows control of imaging and output timing with external trigger input.

●Camera link interface
Dual circuit MDR connectors support medium configurations and base configurations. Outputs all 12.58 megapixels at 25 fps or 12.5 fps.

●TFL-II lens mount
The camera features Toshiba Teli's own TFL-II mount to take full advantage of the large, high-resolution sensor. The optional FTAR-2 mount adapter allows use of F-mount lenses.

Dimensions

CSC12M25BMP19-01B / CSC12M25CMP19



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CSX12M25CMP19

CMOS | CoaX Press | Color row | Progres-sive | 12M

12M color CoaXPress camera

New product

CoaXPress

Overview

This CMOS camera is an Ultra-High-resolution color camera employing a 12,580 thousand pixel readout system CMOS sensor.

Specifications

Item \ Model	CSX12M25CMP19
Image sensor	CMOS image sensor
Effective pixels	4096 (H) x 3072 (V)
Scanning area	24.6 mm (H) × 18.5 mm (V) (1.9 type)
Pixel size	6 μm (H) × 6 μm (V)
Color filter	R, G, B primary color mosaic on-chip color filter
Scan system	Progressive
Sync system	Internal synchronization
Aspect ratio	4:3
Video output	CoaXPress standard compliant raw 8 bit
Readout mode	All pixel readout: 4096 (H) × 3072 (V) [Approx. 25 fps]
Subject illumination	Standard: 3000 lx, F4 5000 K Minimum: 125 lx F2.8 (gain maximum, all pixel readout, approximate 50% video output)
Gain	0 to 18 dB [180 steps] (default: 0 dB)
Gamma	OFF (γ=1.0)
White balance	Manual/one push auto
Trigger signal	TTL
Electronic shutter	1/20,000 to 2 sec. ON/OFF switching
Power supply	DC 24 V ±10% (ripple 50 mVp-p or less)
Power consumption	Approx. 6.5 W
Lens mount	TFL-II mount (Toshiba Teli original)
Dimensions	75 mm (W) × 75 mm (H) × 69.5 mm (D) (not including protrusions)
Weight	Approx. 430 g
Regulations	CE, FCC

Accessory information (options)

- CoaXPress cable
- Lens (TFL-II mount lens) ▶ P36~P39
- F mount conversion adapter (FTAR-2)
  *Ask for our sales or dealer
- Camera mounting kit (CPTC12M) ▶ P34
- CoaXPress compatible image input board ▶ P48

● Connection example ▶ P40
● Pin assignment ▶ P47

Features

●High-speed output of ultra-high-definition images

The TOSHIBA TELI's proprietary 1.9 type 12,580 thousand pixel Ultra-High-resolution CMOS sensor outputs the entire 12,580 thousand pixels in a speed as high as 25 fps.

●Global shutter

As it employs a global electronic shutter similar to a CCD image sensor, clear images of even fast-moving object are obtainable with less blur.

●CoaXPress Interface

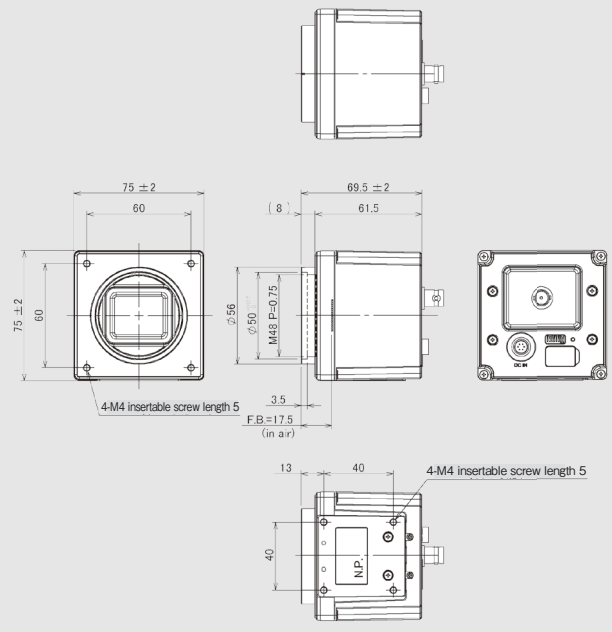
The interface of an image output and camera control has adopted the CoaXPress standard.
CoaXPress can transmit a picture, communication, control, and a power supply with one common coaxial cable at high speed, and it output 12,580 thousand pixel all pixel at the high speed of about 25 fps in this camera.
By using the coaxial cable excellent in long cable length and pliability, it can respond to various pieces of image-processing equipment broadly.

●GenICam compliance

Sinωit is based on GenICam (Generic Interface for Cameras) which is an international industrial use camera standard, camera control can be performed easily.

Dimensions

CSX12M25CMP19



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CSFV90BC3-B/CSFX36BC3-B/CSFS20BC2-B/ CSFV90CC3-B/CSFX36CC3-B/CSFS20CC2-B/

IEEE1394.b interface

Overview

CSF series uses an IEEE1394.b interface.
Selection from black and white or color, and VGA, XGA, SXGA, or UXGA, and all in a compact integral housing.

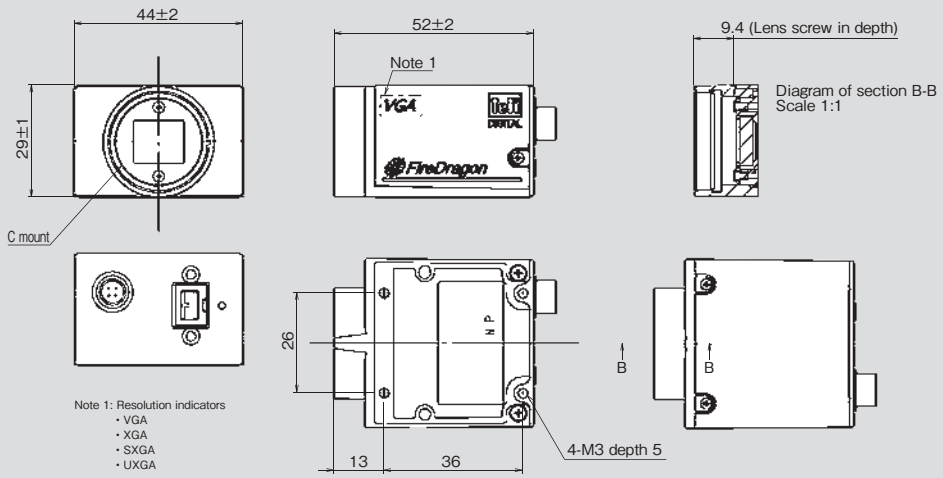
Free software, TeliDCAM (including a viewer, driver, and SDK) for IEEE1394 standard.
Visit our web site to register as a user and download the software.

Features

- ●High frame rate
- ●All pixel readout
- ●Full-frame shutter
- ●Square pixels
- ●Internal color process (color camera)
  Features raw output (8/10-bit selectable) and RGB (24-bit), YUV 4:2:2 (16-bit equivalent), and YUV 4:1:1 (12-bit equivalent) output modes.
- ●IEEE1394.b Interface
  Video output and camera control use the IEEE1394.b high-speed serial interface standard. Data transfers at 800 Mbps.
  Also compatible with IEEE1394.a devices. (Auto detect)
- ●IIDC1394-based digital camera specification ver. 1.32 compliance
- ●Random trigger shutter function
- ●Scalable
- ●Ultra-compact, lightweight

Dimensions

CSFV90BC3-B / CSFX36BC3-B / CSFS20BC2-B / CSFU15BC18-B
CSFV90CC3-B / CSFX36CC3-B / CSFS20CC2-B / CSFU15CC18-B



Accessory information (options)

- IEEE1394 cable
- Lens (C-mount lens) ····· ▶ P36~P39
- IEEE1394 port ····· ▶ P48
- Camera mounting kit (CPT1100CL) ····· ▶ P34

● Connection example ▶ P40
● Pin assignment ▶ P47
● Spectral sensitivity characteristics ▶ P45~P46

Access here for details about products!

CSFU15BC18-B
CSFU15CC18-B

CCD | IEEE 1394.b | Color RGB | B/W | Progres-sive
VGA | XGA | SXGA | UXGA

B/W camera specifications

Item \ Model	CSFV90BC3-B	CSFX36BC3-B	CSFS20BC2-B	CSFU15BC18-B
Image sensor	All pixel readout interline CCD			
Effective pixels	659 (H) x 494 (V)	1034 (H) x 779 (V)	1392 (H) x 1040 (V)	1628 (H) x 1236 (V)
Scanning area	4.88mm x 3.66mm (1/3 type)	4.81mm x 3.62mm (1/3 type)	6.47mm x 4.84mm (1/2 type)	7.16mm x 5.44mm (1/1.8 type)
Pixel size	7.4μm x 7.4μm	4.65μm x 4.65μm	4.65μm x 4.65μm	4.40μm x 4.40μm
Scan system	Non-interlacing			
Sync system	Internal synchronization			
Aspect ratio	4:3			
Internal sync signal	36.0000MHz			
Subject illumination	Standard: 600 lx, F5.6 Min: 2.9 lx, F1.4	Standard: 800 lx, F5.6 Min: 3.9 lx, F1.4	Standard: 500 lx, F5.6 Min: 2.4 lx, F1.4	Standard: 400 lx, F8 Min: 1.0 lx, F1.4
	(Gain maximum, all pixel readout, video level 50%)			
Gain	0 to +18 dB (91 steps)			
Gamma	0.45 ~ 1.00			
Interface	Conforms to IEEE std 1394b-2002 (Transfer rate: 800 Mbps), bilingual supported			
Video output*	640 x 480 90 fps (max.)	1024 x 768 36 fps (max.)	1280 x 960 20 fps (max.)	1600 x 1200 15 fps (max.)
	(changed by scalable setting at format 7 and mode 0.)			
Protocol	IIDC1394-based Digital Camera Specification ver. 1.32 conformity			
Trigger signal	External trigger input: Input level low: 0 to 0.5 V/high: 2.0 to 24.0 V, positive/negative polarity, pulse width minimum 2 μs, input impedance: high Software trigger: Trigger by command control is possible via the IEEE1394 interface			
Electronic shutter	Preset configuration: OFF, 1/100 s, 1/250 s, 1/500 s, 1/1000 s, 1/2000 s, 1/4000 s, 1/10000 s, 1/20000 s (set up in the value field of CSR register)			
Power supply	DC 8 to 30 V (ripple 100 mVp-p or less) power over IEEE1394 connector			
Power consumption	2.6 W (max)			
Lens mount	C-mount			
Dimensions	44 (W) × 29 (H) × 44 (D) mm (not including protrusions)			
Weight	80g			
Regulations	CE, FCC			

*Contact a sales representative for details.

Color camera specifications

Item \ Model	CSFV90CC3-B	CSFX36CC3-B	CSFS20CC2-B	CSFU15CC18-B
Image sensor	All pixel readout interline CCD			
Effective pixels	659 (H) x 494 (V)	1034 (H) x 779 (V)	1392 (H) x 1040 (V)	1628 (H) x 1236 (V)
Scanning area	4.88 mm × 3.66 mm (1/3 type)	4.81 mm × 3.62 mm (1/3 type)	6.47 mm × 4.84 mm (1/2 type)	7.16 mm × 5.44 mm (1/1.8 type)
Pixel size	7.4μm x 7.4μm	4.65μm x 4.65μm	4.65μm x 4.65μm	4.40μm x 4.40μm
Scan system	Non-interlacing			
Sync system	Internal synchronization			
Aspect ratio	4:3			
Subject illumination	Standard: 1,700 lx F5.6 5000K Min: 5.5 lx, F1.4	Standard: 2,400 lx F5.6 5000K Min: 7.8 lx, F1.4	Standard: 1,400 lx F5.6 5000K Min: 4.6 lx, F1.4	Standard: 1,000 lx F8 5000K Min: 1.8 lx, F1.4
	(Gain maximum, all pixel output, video level 50%, gamma ON)			
Gain	−6 ~+18dB			
White balance	Manual/one push auto/full auto 2500 K to 6500 K			
Interface	Conforms to IEEE std 1394b-2002 (Transfer rate: 800 Mbps)			
Video output*	640 x 480 90 fps (max.)	1024 x 768 36 fps (max.)	1280 x 960 20 fps (max.)	1600 x 1200 15 fps (max.)
	(changed by scalable setting at format 7 and mode 0.)			
Protocol	IIDC 1394-based Digital Camera Specification ver.1.32 compliant, bilingual supported			
Trigger signal	External trigger input: Input level low: 0 to 0.5 V/high: 2.0 to 24.0 V, positive/negative polarity, pulse width minimum 2 μs, input impedance: high Software trigger: Trigger by command control is possible via the IEEE1394 interface			
Electronic shutter	Preset configuration: OFF, 1/100 s, 1/250 s, 1/500 s, 1/1000 s, 1/2000 s, 1/4000 s, 1/10000 s, 1/20000 s (set up in the value field of CSR register)			
Gamma	0.45 ~ 1.00			
Power supply	DC 8 to 30 V (ripple 100 mVp-p or less) power over IEEE1394 connector			
Power consumption	2.6 W (max)			
Lens mount	C-mount			
Dimensions	44 (W) × 29 (H) × 44 (D) mm (not including protrusions)			
Weight	80g			
Regulations	CE, FCC			

*Contact a sales representative for details.

SPS02

CMOS

Smart Photo Sensor

Overview

A Smart Photo Sensor is ultra-compact and contains high-speed image processing system. A device that can construct an image system by one chip is used in this sensor. It is capable to high-speed process the image because of preprocessing in the device, and it is also capable to determine a result that a former photoelectric sensor was incapable to.

Accessory information (options)

- Contact your dealer / distributor for details.
- Development Environment Visual Architect
- USB cable (TypeA - microB)
- Various of S-Mount Lens
- Extension Tube for S-Mount Lens
- LED lighting

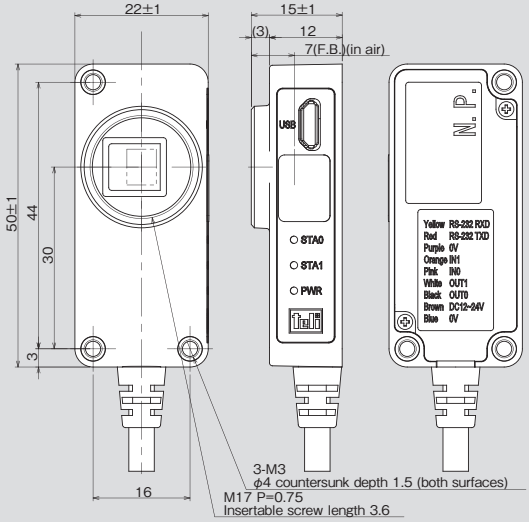
} Ask for our sales or dealer

Specifications

Item \ Model	SPS02
Image sensor	Type 1/2 CMOS sensor
Number of effective pixels	144 x 176
Cell size	33.6 x 33.6 μm
Sensing area	4.8 x 5.9 mm
Exposure time	1μ ~ 20ms
Output	2Line NPN Open Collector Power Supply Voltage 30V or less Residual Voltage 1V or less Load Current 100mA or less
Input	2Line ON Voltage 0.5V or less ON Current 30μA(when short-circuit) OFF Current 50μA or less
USB	USB2.0 High speed USB-Micro Type-B Receptacle
RS-232	TXD/RXD
Protection circuit for GPIO	Output: Over Current Protection Input: Over Voltage Protection
LED signal light	STA0: Red STA1: Green PWR: Orange
Power supply	Power and I/O cable for the power supply DC12 ~ 24V±10%(ripple current 10% or less) USB cable DC5V±5%(ripple current 10% or less)
Power consumption	2.4W
Dimensions	22 (W) ×50 (H) ×12 (D) mm (not including protrusion)
Weight	Approx.56g (included 1m cable)
Lens mount	M17 P=0.75 *S-mount adapter(M12 P0.5) is standard option

Dimensions

SPS02



Smart Photo Sensor is powered by a licensed technology of AnaFocus – www.anafocus.com

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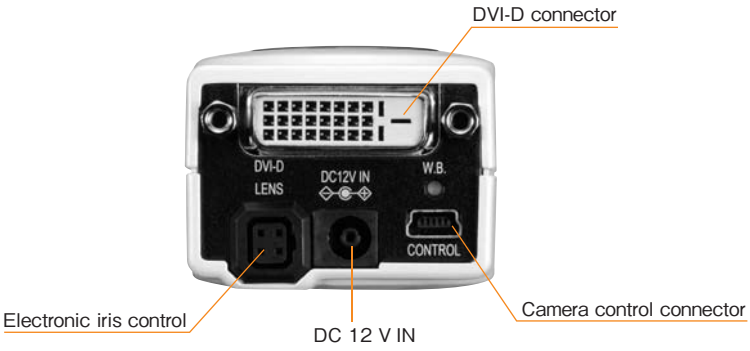
CSDW2M60CM28

CMOS | DVI-D | Color RGB | Progressive | 2M

Full HD camera



Overview

This camera is an integral color camera incorporating a 1/2.8 type single chip CMOS sensor.
It features a DVI-D video output interface for high-speed output of high-resolution video signals.
The color camera unit can be connected directly to a monitor, making it ideal for medical and inspection applications.

Specifications

Item \ Model	CSDW2M60CM28
Image sensor	1/2.8 type CMOS image sensor
Effective pixels	2096 (H) x 1561 (V)
Output image size	1920 (H) x 1080 (V)
Pixel size	2.5μm (H) x 2.5μm (V)
Video output	DVI-D
Scan system	Progressive
Sync system	Internal synchronization
Data clock	148.500/1.001MHz±100ppm
Aspect ratio	16:9
Video output	RGB each 8 bit
Subject illumination	Standard: 2000 lx, F4 5000 K Min: 24 lx (F1.4, Gain: +12 dB, Gamma: 16, video level: 50%)
Gain	Manual/Auto (-6 dB to +12 dB)
Set up level	−16LSB ~ +16LSB
White balance	Manual/One Push Auto/Full Auto/Preset
Gamma	17 steps
Contour correction	High-frequency component/low-frequency component, independent configuration, each 8 steps switchable
Electronic shutter	1/60 s to 1/10,000 s (9 steps)
Power supply	Power supply connector when providing power: DC 12 V ±10% (ripple 50 mVp-p or less) Camera control connector when providing power: DC 5 V ± 5% (ripple 50 mVp-p or less)
Power consumption	Approx. 2.5 W
Lens mount	C mount
Dimensions	44 (W) × 34 (H) × 77 (D) mm (not including protrusions)
Weight	Approx. 100 g
Regulations	CE, FCC

Accessory information (options)

- DVI-D cable
- Power supply adapter (SPU16A-105-ASN) ····· ▶ P32
- AC cable (APC1025-01P) ····· ▶ P32
- Lens (C-mount lens) ····· ▶ P36~P39
- Camera mounting kit (CPT8420) ····· ▶ P34

● Connection example ▶ P40
● Pin assignment ▶ P47

Features

●High frame rate
Outputs full HD size images at 1920 × 1080/60p or 1920 × 1080/60i.

●Color reproductivity
Uses a primary color filter mosaic sensor for outstanding color reproduction.

●DVI-D output
DVI-D video output interface for easy direct connection to monitor.

●Compact, lightweight

●Camera control
It is possible to adjust by PC.

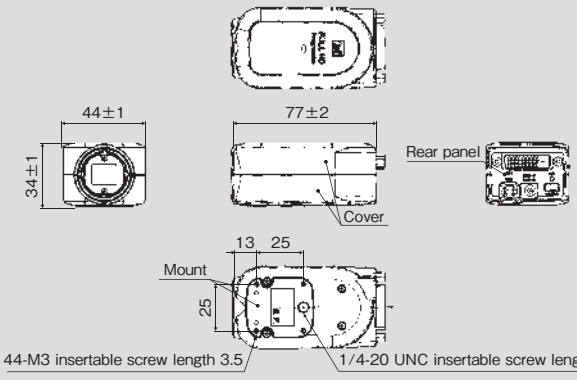
●Grid display
A grid can be displayed on the monitor.

●Electronic lines
Two electronic lines, vertical and horizontal, can be displayed on the monitor.

●Automatic iris control
DC-type auto-iris lenses can be controlled using an EIAJ RC-5204 standard connector.

Dimensions

CSDW2M60CM28



Access here for details about products!

CSDS60CM3

CMOS | DVI-D | Color RGB | Progressive | 1.4M

HD camera

Specifications

Item \ Model	CSDS60CM3
Image sensor	1/3 type CMOS image sensor
Effective pixels	1329 (H) x 1049 (V)
Output image size	1280 (H) × 1024 (V) or 1280 (H) × 720 (V)
Pixel size	3.63μm (H) x 3.63μm (V)
Video output	DVI-D
Scan system	Progressive
Sync system	Internal synchronization
Data clock	108.000MHz±100ppm
Aspect ratio	5:4 or 16:9
Video output	RGB each 8 bit
Subject illumination	Standard: 2000 lx, F4 5000 K Min: 6 lx, F1.4 (Gain +24 dB, Gamma 16, video level 50%)
Gain	Manual/Auto (0 to +24 dB)
Set up level	−16LSB ~+16LSB
White balance	Full Auto/One Push Auto/Manual
Gamma	17 steps switchable
Contour correction	High-frequency component/low-frequency component, independent configuration, each 8 steps switchable
Electronic shutter	1/60 s to 1/10,000 s (9 steps)
Power supply	Power supply connector when providing power: DC 12 V ±10% (ripple 50 mVp-p or less) Camera control connector when providing power: DC 5 V ± 5% (ripple 50 mVp-p or less)
Power consumption	Approx. 2 W
Lens mount	C mount
Dimensions	44 (W) × 29 (H) × 77 (D) mm (not including protrusions)
Weight	Approx. 100 g
Regulations	CE, FCC

Overview

The CSDS60CM3 is an integral color camera incorporating a 1/3 type single chip CMOS sensor.
It features a DVI-D video output interface for high-speed output of high-resolution video signals.
The color camera unit can be connected directly to a monitor, making it ideal for inspection applications.

Features

- Outputs progressive video signals (up to SXGA) at 60 frames per second.
- Uses a primary color filter mosaic sensor for outstanding color reproduction.
- DVI-D video output interface for easy direct connection to monitor.
- Pixel size is selectable between 1,280 (H) × 1,024 (V) at 60 Hz and 1280 (H) × 720 (V) at 60 Hz.

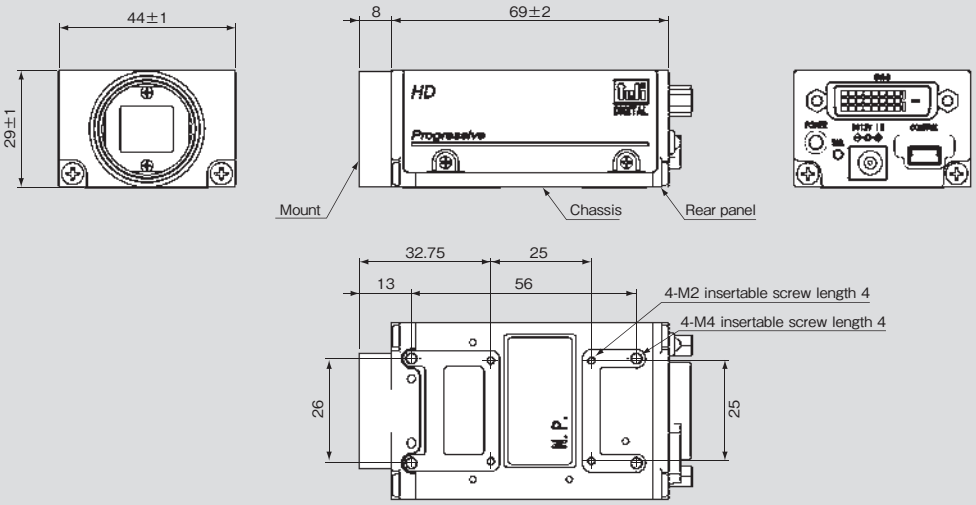
Accessory information (options)

- DVI-D cable
- Power supply adapter (SPU16A-105-ASN) ▶ P32
- AC cable (APC1025-01P) ▶ P32
- Lens (C-mount lens) ▶ P36~P39
- Camera mounting kit (CPT8420) ▶ P34

● Connection example ▶ P40
● Pin assignment ▶ P47

Dimensions

CSDS60CM3



Access here for details about products!

CS9001 series

CCD Analog Color RGB Camera head NTSC

CCD color camera (remote head type)

■Camera head

Overview

This range of products includes three different ultra-compact, lightweight camera heads for incorporation into a wide range of systems.

Features

- ●380,000 effective pixels
- ●VBS, Y/C output
- ●ALC function
- ●Full-auto white balance
- ●Two types, with 3 m and 5 m camera cable lengths (can be extended to 12 meters)

Specifications

Item \ Model	CS9201	CS9301	CS9401-03
Camera head	ϕ17	ϕ12	ϕ12
Camera cable	Specialized cable (3 m, 5 m)		3 m and 5 m cables extend from rear
TV format	NTSC compatible*		
Image sensor	Interline CCD		
Effective pixels	768 (H) x 494 (V)		
Scanning area	6.4 (H) x 4.8 (V) mm 1/2 type	4.8 (H) x 3.6 (V) mm 1/3 type	3.6(H) x 2.7 (V) mm 1/4 type
Scanning lines	525 lines		
Sync system	Internal		
Scan frequency	15.734 kHz (H), 59.94 Hz (V)		
Subject illumination	Standard: 700 lx F8 min: 3 lx, F1.4	Standard: 950 lx F8 min: 5 lx, F1.4	Standard: 2000 lx F8 min: 8 lx, F1.4
Video output	VBS: 1.0 V (p-p), Y/C VS: 1.0 V (p-p), chroma (burst): 0.286 V (p-p)		
Resolution	Horizontal: 470 TV lines, vertical: 350 TV lines		
S/N	46dB		
Power supply	DC12V±10%		
Power consumption	Approx. 550 mA (680 mA CSU9001E)		
CCU Dimensions & weight	120 (W) ×41 (H) × 156 (D) mm (not including protrusions) Approx. 600 g (CSU9001E is 800 g)		
Camera head dimensions/ weight	ϕ17 x 36.2 (D) mm Approx. 16 g	ϕ12 x 39.4 (D) mm Approx. 11 g	ϕ12 x 53.1 (D) mm Approx. 9 g (excluding camera cable)

*Contact a sales representative about PAL specifications.

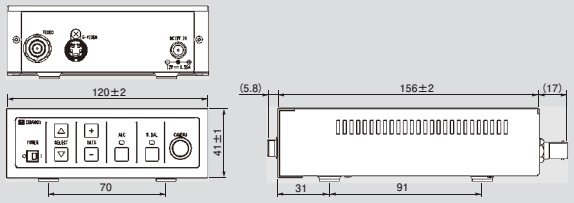
Accessory information (options)

- BNC-BNC cable
- Camera cable (CPRC4000B-XX) ▶ P33
- Power supply adapter
  *Contact a sales representative for information.
- Lens for CS9201B (M15.5 P0.5 male threading) ▶ P36~P39
- Lens for CS9301 and CS9401 (M10.5 P0.5 male threading) ▶ P36~P39
- Camera mounting kit for CS9201 (CPT5130) ▶ P34
- Camera mounting kit for CS9301 and CS9401 (CPT6100) ▶ P34

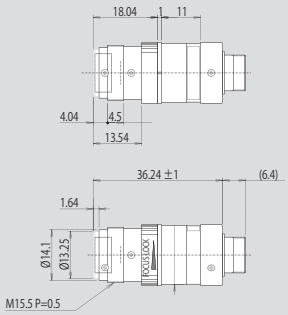
● Connection example ▶ P40
● Pin assignment ▶ P47

Dimensions

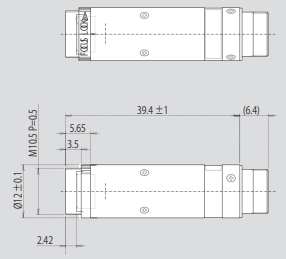
CSU9001



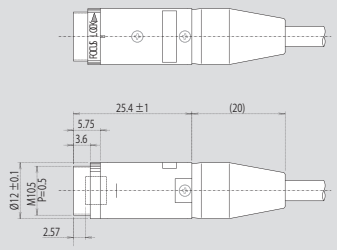
CSH9201



CSH9301



CSH9401



Access here for details about products!

CS4000B series

CCD | Analog | B/W | Camera head | EIA

CCD B/W camera (remote head type)

■Camera head

CSH4200B

CSH4300B

CSH4301B

CSH4310BY

Overview

B/W camera series with unrestricted camera head and CCU serial number matching.
The range includes four different ultra-compact, lightweight camera heads, both round and square, ensuring compatibility with a wide range of devices.

Specifications

Item \ Model	CS4200B	CS4300B	CS4301B	CS4310BY
Camera head	φ17	φ12	φ12	20-mm cube
Camera cable	Specialized cable (3 m, 5 m)		3m	3m
TV format	EIA format compatible*			
Image sensor	Interline CCD			
Effective pixels	768 (H) x 494 (V)			
Scanning area	6.5 (H) x 4.85 (V) mm 1/2 type	4.8 (H) x 3.6 (V) mm 1/3 type		
Scanning lines	525 lines			
Sync system	Internal/external (auto switch-over)			
Scan frequency	15.734 kHz (H), 59.94 Hz (V)			
Subject illumination	Standard: 100 lx, F5.6 Min: 0.5 lx, F1.4	Standard: 150 lx, F5.6 Min: 0.75 lx, F1.4		
Video output	VS: 1.0 V (p-p)/75 Ω AC/DC coupling switchable			
Resolution	570 TV lines (H) × 485 TV lines (V) (350 TV lines)			
S/N	50 dB (Standard)			
Power supply	DC12V±10%			
Power consumption	Approx. 400 mA			
CCU Dimensions & weight	110 (W) × 28 (H) × 156 (D) mm (not including protrusions) Approx. 350 g			
Camera head dimensions/ weight	φ17 x 36.2 (D) mm Approx. 16 g	φ12 x 39.4 (D) mm Approx. 11 g	φ12 x 25.4 (D) mm Approx. 16 g (excluding camera cable)	20 (W) x 20 (H) x 25.8 (D) mm Approx. 11 g (excluding camera cable)
Regulations	CE			

*Contact a sales representative for CCIR specifications.

Accessory information (options)

- BNC-BNC cable
- Power cable (CPC3440-XX) ····· ▶ P33
- Power supply adapter (CA130D-01) ····· ▶ P32
- Camera cable (CPRC4000B-XX) ····· ▶ P33
- Lens for CS4200B (M15.5 P0.5 male threading) ··· ▶ P36~P39
- Lens for CS4300B and CS4301B ····· ▶ P36~P39 (M10.5 P0.5 male threading)
- Lens for CS4310B (M10.5 P0.5 female threading) ··· ▶ P36~P39
- Camera mounting kit for CS4200B (CPT5130) ····· ▶ P34
- Camera mounting kit for CS4300B and CS4301B ····· ▶ P34 (CPT6100)
- Camera mounting kit for CS4310B (CPT4310A) ····· ▶ P34

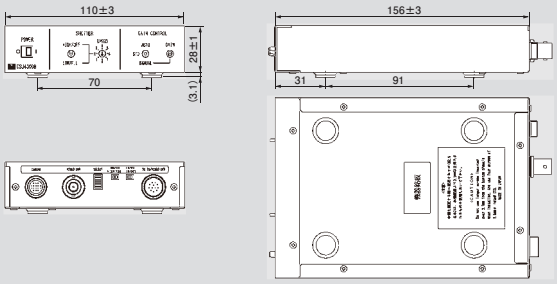
● Connection example ▶ P40
● Pin assignment ▶ P47
● Spectral sensitivity characteristics ▶ P45~P46

Features

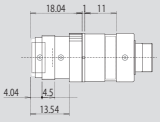
- ●Ultra-compact, lightweight camera head
- ●380,000 effective pixels CCD
- ●Horizontal resolution 570 TV lines (CCIR: 560 TV lines)
- ●Extremely flexible cables
- ●Random trigger shutter function
- ●Special shutter function
- ●Restart/reset function
- ●External synchronization function

Dimensions

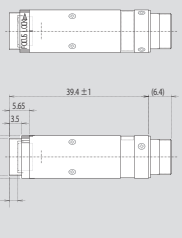
CSU4000B



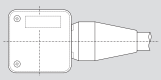
CSH4200B



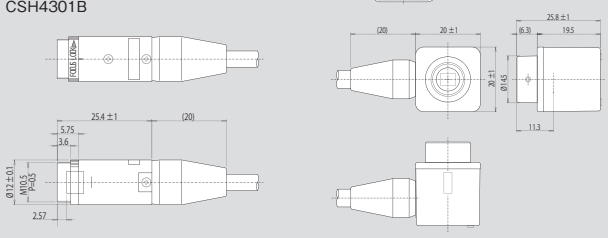
CSH4300B



CSH4310BY



CSH4301B



Access here for details about products!

CS8550Di/-50
CS8550i-01/-51

CCD | Analog | B/W | Progres-sive | VGA

Full-frame CCD camera

Overview

Compact, lightweight, 29 × 29 × 39.5 mm, approx. 50 g
The CS8550i-01/-51 outputs at 30 fps, and the CS8550Di-01/-50 outputs at 60 fps. The CS8550Di-01/-50 in particular helps to reduce tact times as it offers double the EIA standard video output.

Features

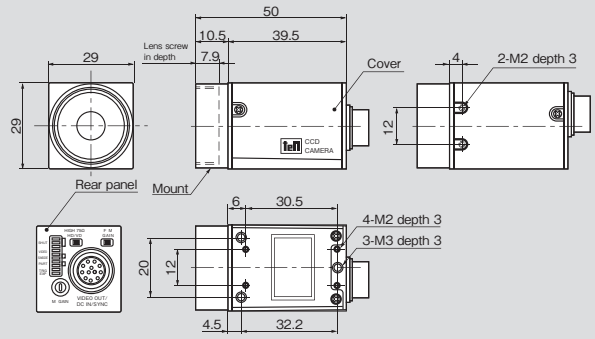
- 1/3 type CCD with 330,000 effective pixels
- Square pixels
- All pixel readout
- External synchronization function
- Random trigger shutter function
- Restart/reset function
- Multiple shutter function
- Partial readout function
- Programmable partial scan function (optional)
- 2 types Video output mode

Specifications

Item \ Model	CS8550Di/-50	CS8550i-01/-51
Image sensor	Interline CCD	
Effective pixels	659 (H) x 494 (V)	
Scanning area	4.88 (H) mm × 3.66 (V) mm 1/3 type	
Scanning lines	525 lines	
Sync system	Internal/external (auto switch-over)	
Scan frequency	Horizontal: 31.468 kHz Vertical: 119.88 Hz (when 2:1 interlace) Or, 59.94 Hz (when non-interlace)	Horizontal: 15.734 kHz Vertical: 59.94 Hz (when 2:1 interlace) Or, 29.97 Hz (when non-interlace)
Subject illumination	Standard: 400 lx, F5.6 Minimum: 4 lx, F1.4 (Gain max)	Standard: 400 lx, F8 Minimum: 2 lx, F1.4 (Gain max)
Video output	VS: 1.0V(p-p)/75Ω	
Horizontal resolution	485 TV lines	
S/N	52 dB (Initial setting)	
Power supply	DC12V±10%	
Power consumption	Approx. 1.8 W	Approx. 1.3 W
Lens mount	C mount	
Dimensions	29 (W) × 29 (H) × 39.5 (D) mm (excluding protrusions)	
Weight	Approx. 50 g	
Regulations	CE	
Non-interlace, vertical blanking	33H Blanking (CS8550Di/CS8550i-01) 33H Blanking (CS8550Di-50/CS8550i-01-51)	

Dimensions

CS8550Di/-50 / CS8550i-01/-51



Accessory information (options)

- BNC-BNC cable
- Power cable (CPRC3700-XX) ▶ P33
- Power supply adapter (CA130D) ▶ P32
- Lens (C-mount lens) ▶ P36~P39
- Camera mounting kit (CPT8550) ▶ P34

● Connection example ▶ P40
● Pin assignment ▶ P47
● Spectral sensitivity characteristics ▶ P45~P46

Access here for details about products!

CS8560BD
CS8570D

CCD | Analog | B/W | Progres-sive | VGA

Double-speed full-frame CCD camera

Overview

Integral type B/W camera using VGA format all pixel readout interline CCD (330,000 effective pixels). For high-speed, high-resolution image processing.

Features

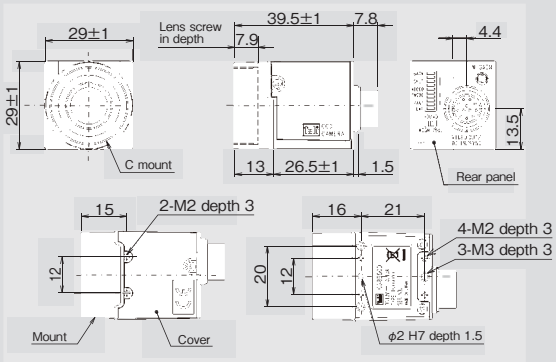
- ●Ultra-compact, lightweight
- ●Double-speed readout
- ●All pixel readout
- ●Square pixels
- ●External synchronization
- ●Random trigger shutter function
- ●Restart/reset
- ●Multiple shutter
- ●Partial scanning

Specifications

Item \ Model	CS8560BD	CS8570D
Image sensor	1/3 type All-pixel-data interline CCD	1/2 type CCD All-pixel-data interline CCD
TV format	Special format (Non-conforming to EIA)	
Scanning lines	525 lines	
Scan system	1/60 s non-interlace mode 1/120 s 2:1 non-interlace mode (switch via rear-panel DIP switches)	
Sync system	Internal/external (auto switch-over)	
Aspect ratio	4:3	
Video output	Video VS: 1.0 V (p-p)/75Ω DC coupling, 1 circuit (AC coupling possible [build-to-order option])	
Resolution	485 TV line (H) 485 TV line (V) (350TV line)	
S/N	52 dB (Initial setting)	
Sensitivity	400 lx, F5.6	
Minimum luminance	4 lx, F1.4 (Gain max, approx. 50% video output)	
Gain	FIX: Initial setting MANU: Setting through GAIN VR (switch via rear-panel DIP switches)	
Gamma	1.0 fixed	
Power supply	DC 12 V ±10% (Ripple voltage: 50 mV (p-p) or less)	
Power consumption	Approx. 1.5 W	
Lens mount	C mount	
Dimensions	29 mm (W) × 29 mm (H) × 26.5 mm (D) (not including protrusions)	
Weight	Approx. 42 g	
Regulations	CE	

Dimensions

CS8560BD / CS8570D



Accessory information (options)

- BNC-BNC cable
- Power cable (CPRC3700-XX) ····· ▶ P33
- Power supply adapter (CA130D) ····· ▶ P32
- Lens (C-mount lens) ····· ▶ P36~P39
- Camera mounting kit (CPT8560) ····· ▶ P34

● Connection example ▶ P40
● Pin assignment ▶ P47
● Spectral sensitivity characteristics ▶ P45~P46

Access here for details about products!

CS8620Bi/30Bi
CS8620BHi/30BH

CCD | Analog | B/W | Inter-lacing | EIA

CCD B/W camera

Overview

Ultra-compact, lightweight integral type B/W camera series using a CCD with 380,000 effective pixels.

Specifications

Item \ Model	CS8620Bi/CS8630Bi
TV format	EIA format compatible*
Image sensor	Interline CCD
Effective pixels	768 (H) x 494 (V)
Scanning area	6.5 (H) mm × 4.85 (V) mm 1/2 type (CS8620Bi/CS8620BHi) 4.8 (H) mm × 3.6 (V) mm 1/3 type (CS8630Bi/CS8630BH)
Scanning lines	525 lines
Sync system	Internal/external (auto switch-over)
Scan frequency	15.734 kHz (H), 59.94 Hz (V)
Subject illumination	Standard: 200 lx, F5.6, minimum: 0.2 lx F1.4 (CS8620Bi/CS8630Bi) Standard: 400 lx, F5.6, minimum: 0.1 lx F1.4 (CS8620BHi) Standard: 400 lx, F8, minimum: 0.2 lx F1.4 (CS8630BH)
Video output	VS: 1.0V(p-p)/75Ω
Resolution	570 TV lines (H) × 485 TV lines (V) (350 TV lines)
S/N	60 dB (Standard)
Power supply	DC12V±10%
Power consumption	Approx. 1.3 W
Lens mount	C mount
Dimensions	29 (W) × 29 (H) × 31 (D) mm (not including protrusions)
Weight	Approx. 50 g
Regulations	CE, FCC

*Contact a sales representative for CCIR specifications.

Accessory information (options)

- BNC-BNC cable
- Power cable (CPRC3700-XX) ····· ▶ P33
- Power supply adapter (CA130D) ····· ▶ P32
- Lens (C-mount lens) ····· ▶ P36~P39
- Camera mounting kit (CPT8600) ····· ▶ P34

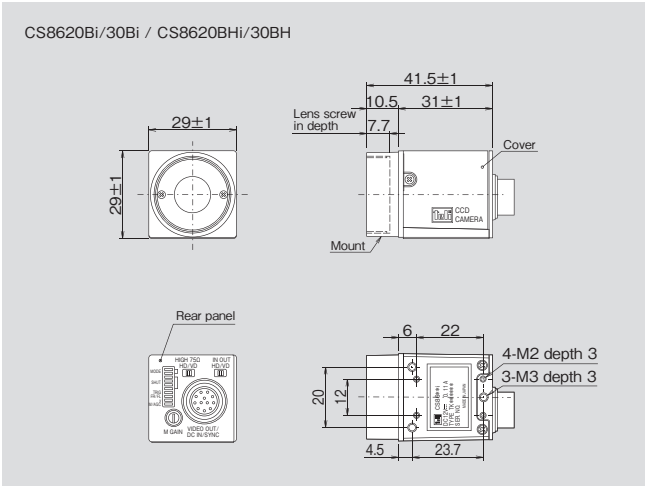
● Connection example ▶ P40
● Pin assignment ▶ P47
● Spectral sensitivity characteristics ▶ P45~P46

Features

- ●Ultra-compact and lightweight, measuring 29 mm × 29 mm × 31 mm and weighing approx. 50 g
- ●High SN ratio: 60 dB (standard)
- ●Capable of imaging in the near-infrared range (CS8620BHi/20BHCi 30Hi)
- ●Random trigger shutter function
- ●Special shutter function
- ●Restart/reset function
- ●External synchronization function
- ●Rear DIP switches

Dimensions

CS8620Bi/30Bi / CS8620BHi/30BH



Access here for details about products!

9LM20SB

Access here for details about products!

8.4 type LCD B/W monitor

Specifications

Item \ Model		9LM20SB
Display (LCD panel)	Display device	8.4 type TFT-LCD module
	Pixel format	800 (H) x 600 (V)
	Gray scale	256-gradation
	Back light	Edge light type
Display interface		EIA standard
Video input	Input signal	VBS 1.0V (p-p) (VIDEO 0.7V (p-p) SYNC 0.3V (p-p))
	Connector	BNC connector × 1
Brightness		450cd/m^2 (Typ), 350cd/m^2 (Min)
Contrast		600:1
Power source	Input voltage	DC12V±0.5V AC 100 - 240 V ±10%, 50/60 Hz (when using AC adapter)
	Current consumption	0.7 A or less
Operating environment		Temperature: 0 to 35° C, humidity: 20 to 85% (however, no condensation)
Dimensions		220±3 (W) x 250±3 (H) x 130±1 (D) mm
Weight		less than 1.5 kg
Regulations		CE, FCC

*Power supply adapter is optional.

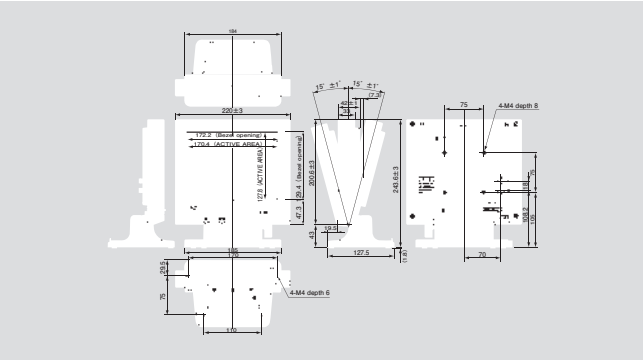
Overview

B/W LCD monitor featuring 8.4 type LCD panel (TFT-LCD module) for displaying video images (EIA compliant signal). Shows clear and sharp images over a EIA compliant signals using 8 bit (256 gradation).

Features

- LED back light
- Progressive scanning
- Underscan display
- Allows cascade connection (auto terminating function)
- Compatible with VESA-compliant free mounting
- Energy-saving mode compliant with Energy Star standard

Dimensions



T05SSB003

Access here for details about products!

5.6 type LCD color monitor

Specifications

Item \ Model	T05SSB003
Display device	5.6 type TFT-LCD module
Display area	113.3mm (H) x 84.7mm (V)
Color	320dot (H) [RGB] x 234dot (V)
Back light	3×6 LED back light system
Input signal	NTSC (M)/PAL (B/G) format compatible
Input level	VBS: 1.0V (p-p) 75Ω
Connector	RCA pin jack × 1 line
Brightness	500cd/m^2 (Typ) / 360 cd/m^2 (Min)
Contrast	300:1 (Typ)
Input voltage	DC12V±0.5V
Power consumption	0.45 A or less
Ambient conditions	Temperature: 0 to 40° C, humidity: 20 to 85% (no condensation)
Dimensions	160 (W) x 120 (H) x 38 (D) mm
Weight	Approx. 400 g
Regulations	CE

*AC adapter is optional

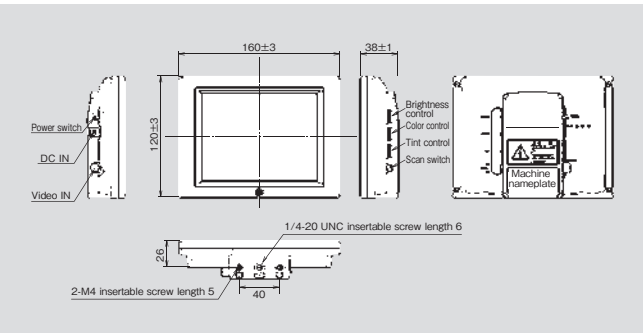
Overview

Can be directly connected to composite video signals, such as from television cameras, to display images.

Features

- High contrast
- 320 (H) × 234 (V) dot RGB full-color display
- 180-degree rotatable display
- The unit can be mounted on a camera tripod

Dimensions



VR570

Access here for details about products!

Image recorder

Features

- Video is encoded using the H.264 image compression format for high-quality images at low bit rates.
- Still images can be recorded even while recording or playing back video.
- Supports SDHC cards of up to 32 GB. Extended recording.
- Images recorded can be played back on a PC using any media player that supports MP4.
- Uses 5.6 type LCD monitor for easy viewing.

Overview

Connect this device to an analog (NTSC/PAL) color television camera and view video (mp4) and still (jpg) images on the LCD monitor and record or play the images on SD/SDHC cards.

Specifications

Item \ Model	VR570
LCD	5.6 type TFT-LCD module
TV format	Analog video signal NTSC/PAL compatible (switchable)
Resolution	320x (RGB) (H) x 234 (V)dot
Display area	113.3 (H) x 84.7 (V) mm
Recording quality	Still images: JPEG Full: 640 × 480 (NTSC), 768 × 576 (PAL) Small: 320 × 240 (NTSC), 384 × 288 (PAL) Video images: MPEG (H.264 High Profile) Full: 720 × 480 30 fps (NTSC), 720 × 576 25 fps (PAL) Small: 320 × 240 30 fps (NTSC), 360 × 288 25 fps (PAL)
Storage media	SD card up to 2 GB, SDHC card up to 32 GB *Individual files cannot exceed 4 GB or 180 minutes in length. Recommended SD/ SDHC cards Toshiba's SD-C Series Transcend's TS1GSDC,TS2GSDC, TS4GSDHC6 to TS16GSDHC
Video input/output signal	RCA PIN jack input×1, output×1
Power supply	DC12V±5%
Power consumption	900mA
Dimensions	170 (W) x 120 (H) x 40 (D) mm
Weight	Approx. 570 g

*Because the video recording formats are different, video recorded on VR560SD cannot be played back on the VR570.

*AC adapter is optional

Power supply adapter/Cable/Camera mounting kit compatibility table

Camera model / Options			Power supply adapter				Cable between camera and power supply adapter				Cable between camera head and CCU		Camera mounting kit	Remarks
			CA130D	CA130D-01	STD-12020T-H	SPU16A-105-ASN	CPC3440	CPRC3700	CPC3910	CPCD-S60CM3	CPRC4000B	CPC4000B-07J		
						Power cord sold separately (APC1025-01P)	12 Pin-12 Pin	12 Pin - 12 Pin, flexible	6Pin-12pin	12 pin DC plug		For extensions		
Digital cameras	USB3.0	BU031	Supplied from USB 3.0 cable, so not needed				(USB 3.0 cable)				–	–	CPTBU	
		BU030	Supplied from USB 3.0 cable, so not needed				(USB 3.0 cable)				–	–	CPTBU	
		BU080	Supplied from USB 3.0 cable, so not needed				(USB 3.0 cable)				–	–	CPTBU	
		BU130	Supplied from USB 3.0 cable, so not needed				(USB 3.0 cable)				–	–	CPTBU	
	Gig-E(PoE)	BG031	Supplied from Gig-E cable, so not needed				(Gig-E cable)				–	–	CPT8600	
		BG030	Supplied from Gig-E cable, so not needed				(Gig-E cable)				–	–	CPT8600	
		BG080	Supplied from Gig-E cable, so not needed				(Gig-E cable)				–	–	CPT8600	
		BG130	Supplied from Gig-E cable, so not needed				(Gig-E cable)				–	–	CPT8600	
	CSG series	CSGV90BC3-B	○	○					○		–	–	CPT8420	
		CSGX36BC3-B	○	○					○		–	–	CPT8420	
		CSGS20BC2-B	○	○					○		–	–	CPT8420	
		CSGS15BC23-B	○	○					○		–	–	CPT8420	
		CSGU15BC18-B	○	○					○		–	–	CPT8420	
		CSGV90CC3-B	○	○					○		–	–	CPT8420	
		CSGX36CC3-B	○	○					○		–	–	CPT8420	
		CSGS20CC2-B	○	○					○		–	–	CPT8420	
		CSGU15CC18-B	○	○					○		–	–	CPT8420	
	CSC series	CSCLV90BC3	Supplied from CameraLink cable, so not needed				(CameraLink cable)				–	–	CPT8531A	
		CSCV125BC3	Supplied from CameraLink cable, so not needed				(CameraLink cable)				–	–	CPT8560	
		CSCV125CC3	Supplied from CameraLink cable, so not needed				(CameraLink cable)				–	–	CPT8560	
		CSCV90BC3	Supplied from CameraLink cable, so not needed				(CameraLink cable)				–	–	CPT8560	
		CSCX30BC3	Supplied from CameraLink cable, so not needed				(CameraLink cable)				–	–	CPT8560	
		CSCS20BC2	Supplied from CameraLink cable, so not needed				(CameraLink cable)				–	–	CPT8560	
		CSCU15BC18	Supplied from CameraLink cable, so not needed				(CameraLink cable)				–	–	CPT8560	
		CSCU30BC18	Supplied from CameraLink cable, so not needed				(CameraLink cable)				–	–	CPT4000CL	
		CSCU30CC18	Supplied from CameraLink cable, so not needed				(CameraLink cable)				–	–	CPT4000CL	
		CSCQS15BC23	○	○	○		○	○			–	–	CPT4000CL	
		CSCQS15CC23	○	○	○		○	○			–	–	CPT4000F	
		CSCQS9CC23	○	○	○		○	○			–	–	CPT4000F	
		CSC6M85BMP11	Supplied from CameraLink cable, so not needed				(CameraLink cable)				–	–	CPT6M	
		CSC12M25BMP19-01B	○	○	○		○	○			–	–	CPTC12M	
		CSC12M25CMP19	○	○	○		○	○			–	–	CPTC12M	
	CSX series	CSX12M25CMP19	Supplied from BNC coaxial cable, so not needed				(BNC coaxial cable)				–	–	CPTC12M	
	CSF series	CSFV90BC3-B	Supplied from IEEE1394 cable, so not needed				(IEEE1394.b cable)				–	–	CPT1100CL	
		CSFX36BC3-B	Supplied from IEEE1394 cable, so not needed				(IEEE1394.b cable)				–	–	CPT1100CL	
		CSFS20BC2-B	Supplied from IEEE1394 cable, so not needed				(IEEE1394.b cable)				–	–	CPT1100CL	
		CSFU15BC18-B	Supplied from IEEE1394 cable, so not needed				(IEEE1394.b cable)				–	–	CPT1100CL	
		CSFV90CC3-B	Supplied from IEEE1394 cable, so not needed				(IEEE1394.b cable)				–	–	CPT1100CL	
		CSFX36CC3-B	Supplied from IEEE1394 cable, so not needed				(IEEE1394.b cable)				–	–	CPT1100CL	
		CSFS20CC2-B	Supplied from IEEE1394 cable, so not needed				(IEEE1394.b cable)				–	–	CPT1100CL	
		CSFU15CC18-B	Supplied from IEEE1394 cable, so not needed				(IEEE1394.b cable)				–	–	CPT1100CL	
Color camera		CSDW2M60CM28		○		○				○	–	–	CPT8420	
		CSDS60CM3		○		○				○	–	–	CPT8420	
		CS9201	Contact a sales representative for more information				Contact a sales representative for more information				○	○	CPT5130	
		CS9301	Contact a sales representative for more information				Contact a sales representative for more information				○	○	CPT6100	
		CS9401-03	Contact a sales representative for more information				Contact a sales representative for more information				–	○	CPT6100	Cable direct from camera
B/W camera		CS4200B	○	○	○*		○	○			○	○	CPT5130	
		CS4300B	○	○	○*		○	○			○	○	CPT6100	
		CS4301B	○	○	○*		○	○			–	○	CPT6100	Cable direct from camera
		CS4310B	○	○	○*		○	○			–	○	CPT4310A	
		CS8550Di/-50	○	○			○	○			–	–	CPT8550	
		CS8550i-01/-51	○	○			○	○			–	–	CPT8550	
		CS8560BD	○	○			○	○			–	–	CPT8560	
		CS8570D	○	○			○	○			–	–	CPT8560	
		CS8310Bi		○	○*		○	○			–	–	CPT8420	
		CS8620Bi/BHi	○	○			○	○			–	–	CPT8600	
		CS8630Bi/BH	○	○			○	○			–	–	CPT8600	
Monitor		9LM20SB	Specialized (STD-1225P-L)				–	–	–	–	–	–	–	
		T05SSB003	Specialized (STD-1225P-L(V))				–	–	–	–	–	–	–	
		T15MSA210-MD	Specialized (HEMG49-S120400-7LF)				–	–	–	–	–	–	–	
		VR570	Specialized (STD-1225P-L)				–	–	–	–	–	–	–	

○ Can be used *Cannot do external synchronization when using STD-12020T-H

Power supply adapter (option)

CA130D/CA130D-01

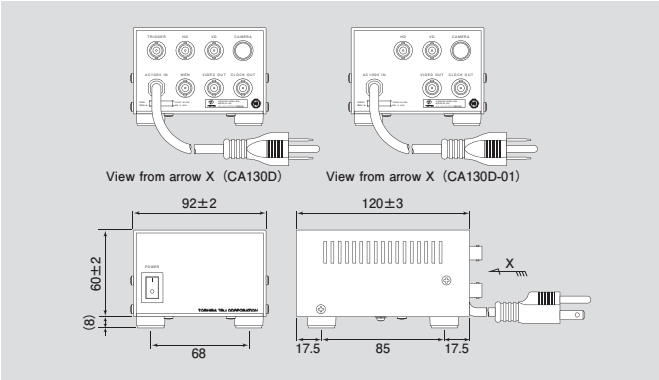
Ideal for use with image processing units having BNC input/output connectors.
Used with composite 12-core power supply cable.

*JAPANESE MARKET only

Specifications

Item \ Model	CA130D/CA130D-01
Input voltage	AC100V±10% 50/60Hz
Output voltage	DC 12 V ±5%
Output current	0.9 A (at the maximum ratings)
Power consumption	28 VA (at the maximum ratings)
Dimensions & weight	92 (W) × 68 (H) × 120 (D) mm, approx. 1 kg

Dimensions



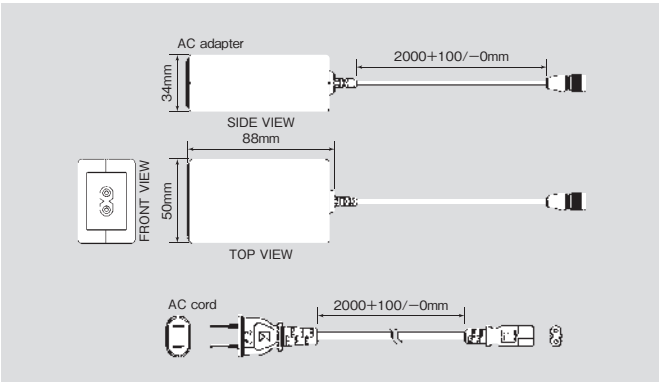
STD-12020T-H

Ideal for internally synchronized cameras.

Specifications

Item \ Model	STD-12020T-H
Input voltage	AC100V ~ 240V 47 ~ 63Hz
Output voltage	DC12V±5%
Output current	2.0 A (at the maximum ratings)
Dimensions & weight	50 (W) × 34 (H) × 88 (D) mm, approx. 200 g

Dimensions



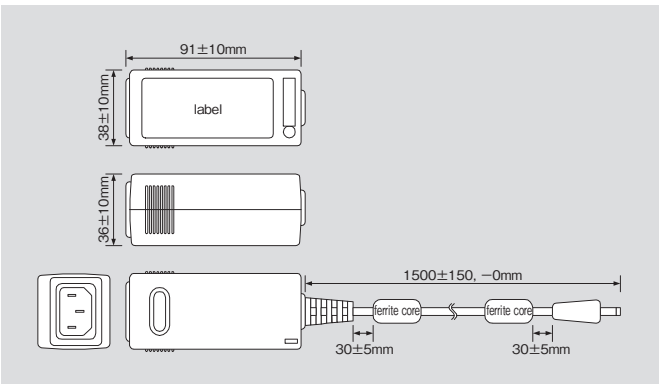
SPU16A-105ASN

Power supply for HD or FULL HD camera.

Specifications

Item \ Model	SPU16A-105ASN
Input voltage	AC100 ~ 240V
Output voltage	DC12V±10%
Output current	Max. 1.25 A
Dimensions & weight	38 (W) × 36 (H) × 91 (D) mm, approx. 165 g

Dimensions



Cables (options)

■Cable between camera and power supply adapter (12 Pin - 12 Pin) CPC3440-XX

Model	Cable length
CPC3440-02	2m
CPC3440-03	3m
CPC3440-05	5m
CPC3440-10	10m

●Applicable cameras

CSCQS15BC23 CSCQS15CC23 CSCQS9CC23
CSC12M25BMP19-01B CSC12M25CMP19 CS4200B
CS4300B CS4301B CS4310B
CS8550Di/-50 CS8550i-01/-51 CS8560BD
CS8570D CS8310Bi CS8620Bi/BHi
CS8630Bi/BH

■Cable between camera and power supply adapter (12 Pin - 12 Pin) CPRC3700-XX

Model	Cable length
CPRC3700-02	2m
CPRC3700-03	3m
CPRC3700-05	5m
CPRC3700-10	10m

●Applicable cameras

CSCQS15BC23 CSCQS15CC23 CSCQS9CC23
CSC12M25BMP19-01B CSC12M25CMP19 CS4200B
CS4300B CS4301B CS4310B
CS8550Di/-50 CS8550i-01/-51 CS8560BD
CS8570D CS8310Bi CS8620Bi/BHi
CS8630Bi/BH

■Cable between camera and power supply adapter (6 Pin - 12 Pin) CPC3910-XX

Model	Cable length
CPC3910-03	3m
CPC3910-05	5m

●Applicable cameras

CSGV90BC3-B CSGX36BC3-B CSGS20BC2-B
CSGS15BC23-B CSGU15BC18-B CSGV90CC3-B
CSGX36CC3-B CSGS20CC2-B CSGU15CC18-B

■Cable between camera and power supply adapter (DC plug - 12 P) CPCDS60CM3-XX

Model	Cable length
CPCDS60CM3-03	3m
CPCDS60CM3-06	6m

●Applicable cameras

CSDW2M60CM28 CSDS60CM3

■Cable between camera head and CCU, CPRC4000B-XX

Model	Cable length
CPRC4000B-03	3m
CPRC4000B-05	5m

●Applicable cameras

CS9201 CS9301 CS4200B
CS4300B

■Cable between camera head and CCU (for extensions) CPC4000B-07J

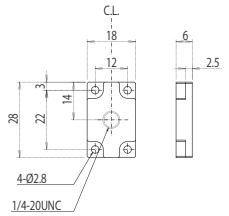
Model	Cable length
CPC4000B-07J	7m

●Applicable cameras

CS9201 CS9301 CS9401-03
CS4200B CS4300B CS4301B
CS4310B

Camera mounting kit (options)

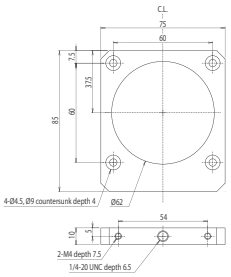
■CPT8600



●Applicable cameras

BG031
BG030
BG080
BG130
CS8620Bi/BHi
CS8630Bi/BHi

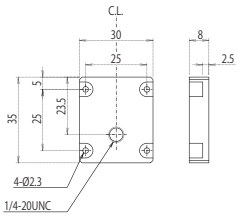
■CPTC12M



●Applicable cameras

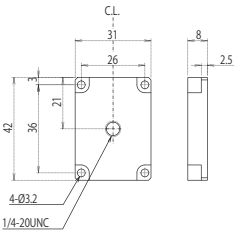
CSC12M25BMP19-01B
CSC12M25CMP19
CSX12M25CMP19

■CPT8420



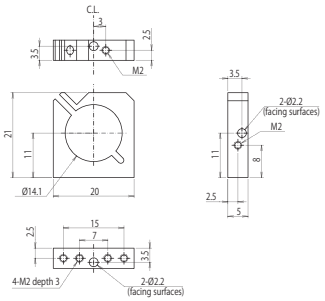
CSGV90BC3-B
CSGX36BC3-B
CSGS20BC2-B
CSGS15BC23-B
CSGU15BC18-B
CSGV90CC3-B
CSGX36CC3-B
CSGS20CC2-B
CSGU15CC18-B
CSDW2M60CM28
CSDS60CM3
CS8310Bi

■CPT1100CL



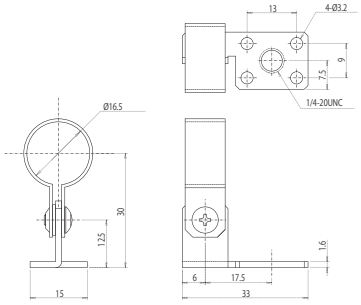
CSFV90BC3-B
CSFX36BC3-B
CSFS20BC2-B
CSFU15BC18-B
CSFV90CC3-B
CSFX36CC3-B
CSFS20CC2-B
CSFU15CC18-B

■CPT8531A



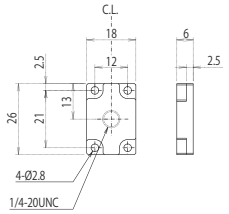
CSCLV90BC3

■CPT5130



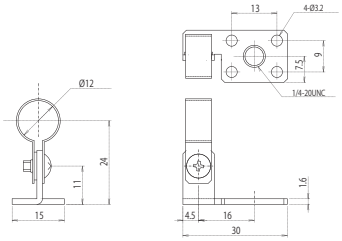
CS9201
CS4200B

■CPT8560



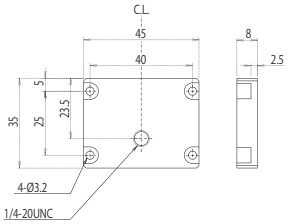
CSCV125BC3
CSCV125CC3
CSCV90BC3
CSCX30BC3
CSCS20BC2
CSCU15BC18
CS8560BD
CS8570D

■CPT6100



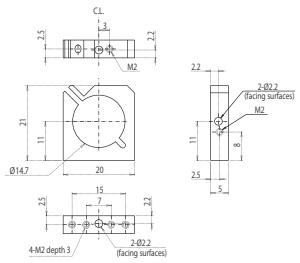
CS9301
CS9401-03
CS4300B
CS4301B

■CPT4000CL



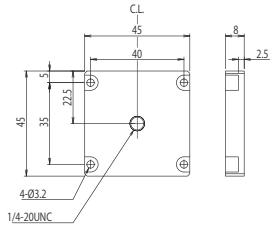
CSCU30BC18
CSCU30CC18
CSCQS15BC23

■CPT4310A



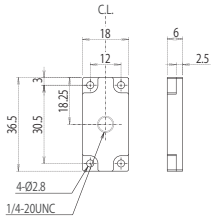
CS4310B

■CPT4000F



CSCQS15CC23
CSCQS9CC23

■CPT8550



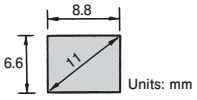
CS8550Di/-50
CS8550i-01/-51

Explanation of lens

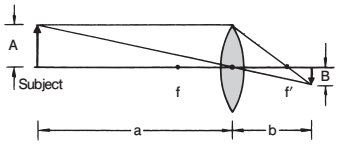
◎TV camera and lens selection

TV cameras can be used with various replaceable lenses, as with SLR still cameras. Just as one selects the lens and film to suit the desired purpose when photographing with SLR cameras, an appropriate TV camera and lens combination must also be selected. Here we describe the applicable procedures for using the Toshiba Teli CS8310Bi.

The imaging area of the CS8310Bi is 6.6 mm × 8.8 mm. This size corresponds to the film size of a still camera. The image is produced on this plane by a lens.



The standard focal length for the CS8310Bi (2/3 type) TV camera lens is 16 mm (equivalent to 50 mm on an SLR camera). Lenses shorter than this are called wide-angle lenses, while longer lenses are called telephoto lenses.



a: Distance from subject to lens center (principle point)
b: Distance from lens center (principle point) to imaging area
A: Subject size
B: Size of subject image projected on imaging area
f: Lens focal length

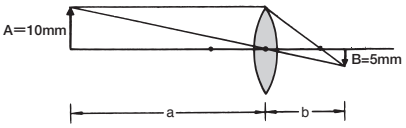
Image measurement requires the use of close-up imaging, since the subject is normally small.

The subject, lens, and camera imaging sensor are configured as shown above. The following equation is satisfied if the system is in focus.

$$\frac{B}{A} = \frac{b}{a} \cdots\cdots 1 \qquad \frac{1}{a} + \frac{1}{b} = \frac{1}{f} \cdots\cdots 2$$

The magnification M for the optical system here is $\frac{B}{A}$ (magnification ratio). A typical calculation is shown below.

Ex. 1. Producing a 5 mm long image of a 10 mm long subject on the camera imaging area.



Given a = 100 mm. From (1): $b = \frac{aB}{A} = \frac{100 \times 5}{10} = 50$ mm

From (2): $f = \frac{ab}{a+b} = \frac{100 \times 50}{100+50} = 33$ mm

33 mm focal length lenses are not commercially available, so the closest, 35 mm, is used. In this case, an extension tube is used with a length of b - f = 15 mm.

Ex. 2. What distances a and b are required to produce a 5 mm long image of a 10 mm long subject on the camera imaging area using a 50 mm focal length lens?

From (1): $\frac{B}{A} = \frac{b}{a} = \frac{1}{2}$ $b = \frac{a}{2}$

From (2): $\frac{1}{a} = \frac{1}{b} = \frac{1}{f}$ $a = \frac{f(A+B)}{B} = \frac{50(10+5)}{5} = 150$ mm

$b = \frac{a}{2} = 75$ mm

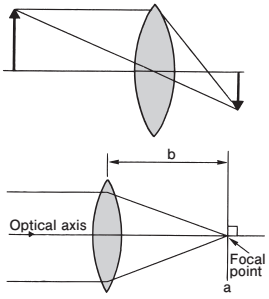
The length of the extension tube used should be b - f = 75 - 50 = 25 mm.

Note that the above calculations are for thin lenses. Actual lenses used are compound lenses, so variances arise due to differences in the lens centers (principal points) when viewed from the front or rear of the lens. (This is normally no more than a few mm, and so can often be ignored.)

1. CCTV lenses

The following two types of lens are currently used with CCTV cameras:
(1) C-mount lenses
Used with B/W and single-panel color cameras.
(2) Bayonet mount lenses
Used with 3CCD color and other cameras.

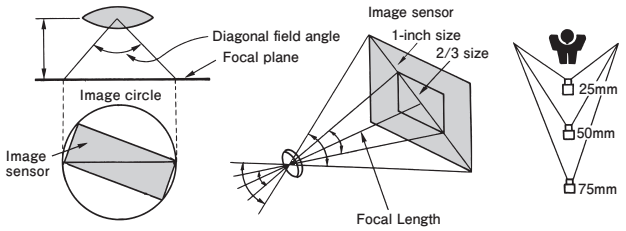
2. Focal length



●Characteristics of convex lenses
(1) Light rays from a single point on the subject are refracted and focused to a single point.
(2) Light rays entering from an infinite distance parallel to the optical axis intersect at a point on the optical axis. This point on the axis is referred to as the "focal point," and the plane (a) containing this point and perpendicular to the axis is called the "focal plane." CCTV image sensors are positioned on the focal plane. The distance (b) from the lens center (principal point) to the focal point is called the "focal length."

3. Field angle

Depending on the focal length, the extent of imaging on the image sensor will vary. The extent of imaging for this lens is called "field angle." Even for lenses with the same focal length, the field angle will vary for different image sensor sizes.

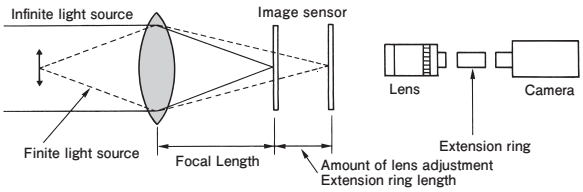


4. F number

Lens brightness is expressed as a ratio involving the lens aperture and focal length. Aperture ratio is the ratio of the effective lens aperture to the focal length and indicates the multiplying factor of the focal length when the effective lens aperture is 1. If the effective lens aperture is D and the focal length is f, the aperture ratio is expressed as D/f and a larger value indicates a brighter lens. The inverse of the aperture ratio is called the F number, and for convenience, lens brightness is expressed as an F number (e.g., F1.4).

5. Closeup filming

The following two methods exist for imaging at a distance shorter than the minimum distance for the lens.



(a) Using an extension ring
When incident light on the lens forms an image, light from a finite source will form an image further from the lens than for light from an infinite source, as shown in the figure above. The lens must therefore be extended to ensure focus. An extension ring is used when imaging subjects closer than the minimum distance for the lens.
(b) Using a close-up lens
Close-up imaging is made possible by mounting a close-up lens on the front of the lens being used.

6. Digital magnification

This is the ratio of the size of the CCD camera imaging area to the monitor.

■Correlation between 2/3 type CCD and monitor TV magnification

2/3 type CCD	5-inch monitor	9-inch monitor	12-inch monitor	14-inch monitor	15-inch monitor
Horizontal 8.8 mm	Approx. 98	Approx. 176	Approx. 235	Approx. 280	Approx. 300
Vertical 6.6 mm	Approx. 73	Approx. 132	Approx. 176	Approx. 210	Approx. 225
Magnification (times)	Approx. 11	Approx. 20	Approx. 26	Approx. 31	Approx. 34

*Magnification is approximate due to monitor reflection variances.

■Range of focus for extension ring length and focal length

Lens focal length and subject distance		f=12.5mm	f=25mm	f=50mm	f=75mm	f=8.5mm	f=16mm
		inf.0.3m	inf.0.6m	inf.1.0m	inf1.2m	inf.0.2m	inf.0.5m
Extension ring length	0.5mm	36cm～20cm	129cm～43cm			19cm～12cm	56cm～28cm
	1.0mm	20cm～14cm	67cm～34cm			11cm～9cm	30cm～20cm
	1.5mm(1+0.5)	15cm～12cm	46cm～28cm	178cm～68cm		9cm～8cm	21cm～16cm
	5.0mm	8cm～8cm	17cm～15cm	60cm～41cm	129cm～68cm		9cm～8cm
	10mm		11cm～10cm	34cm～21cm	71cm～50cm		6cm～6cm
	15mm		9cm～8cm	26cm～23cm	51cm～41cm		
	20mm		8cm～8cm	22cm～20cm	42cm～35cm		
	25mm(20+5)			19cm～18cm	36cm～32cm		
	30mm(20+10)			17cm～17cm	32cm～29cm		
	35mm(20+10+5)			16cm～16cm	29cm～27cm		
	40mm			15cm～15cm	27cm～25cm		
	45mm(40+5)				25cm～24cm		
	50mm(40+10)				24cm～23cm		
	55mm(40+10+5)				23cm～22cm		
	60mm(40+20)				22cm～21cm		
	65mm(40+20+5)				21cm～21cm		

*Focus will blur when zooming using an extension lens with a zoom lens.

◎Filter

ND filter

This filter adjusts light levels without altering the color temperature. ND filters include ND2, which adjusts light levels by one stop, ND4, which adjusts light levels by two stops, and ND8, which adjusts light levels by three stops. These filters preserve outstanding color fidelity.

PL filter

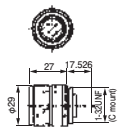
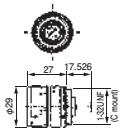
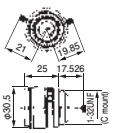
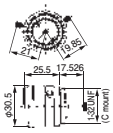
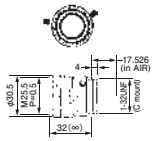
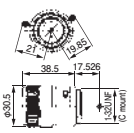
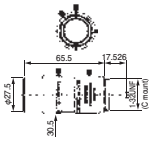
Filter effective for removing light reflected from glass surfaces.

IR filter

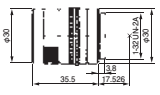
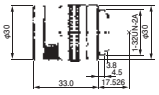
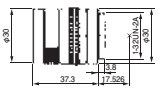
Filter for removing long wavelengths of near-infrared.

C-mount lens (options)

■Small lens

External view							
Model	**219HA**	**25HA**	**17HF**	**20HC**	**35HB**	**21HC**	**1A1HB**
CCD size	2/3 type	2/3 type	2/3 type	2/3 type	2/3 type	2/3 type	2/3 type
Focal length (mm)	8	12	16	25	35	50	75
Iris range	1.4 ~ 16	1.8 ~ 16	1.4 ~ 16	1.6 ~ 16	2.1 ~ 22	2.8 ~ 22	3.9 ~ 32
Field angle (°) horizontal	59.2	40.5	30.5	19.6	14.3	10.0	6.5
Vertical	45.1	30.5	28.2	15.0	10.8	7.3	5.1
External dimensions (mm)	ϕ29 x 27	ϕ29 x 27	ϕ30.5 x 25	ϕ30.5 x 25.5	ϕ30.5×32	ϕ30.5 x 38.5	ϕ30.5 x 65.5
Weight (g)	40	40	50	40	44	52	68
Remarks			w/Lock	w/Lock	w/Lock	w/Lock	w/Lock

■Small lens

External view			
Model	**FL-HC1212B-VG**	**FL-CC1614A-VG**	**FL-BC2514D-VG**
CCD size	1/2 type	2/3 type	1 type
Focal length (mm)	12	16	25
Iris range	F1.2 ~ F22	F1.4 ~ F22	F1.4 ~ F22
Field angle (°) horizontal	30.2	30.8	20.0
Vertical	22.6	23.4	15.0
External dimensions (mm)	ϕ30 x 35.5	ϕ30 x 33	ϕ30 x 37.3
Weight (g)	67	58	76
Remarks	w/Lock	w/Lock	w/Lock Field angle is value for 2/3 type

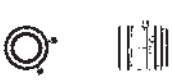
■Extension ring FP-RGST

Used in conjunction with C-mount lenses.
6-piece set consisting of 0.5 mm, 1 mm, 5 mm, 10 mm, 20 mm, and 40 mm rings.

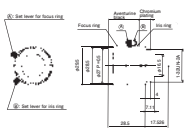
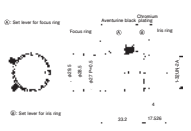
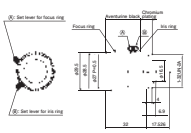
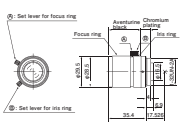
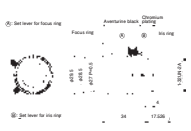
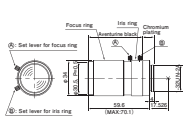
■Extender (2x) FP-EX2

Used in conjunction with C-mount lenses.
Doubles the focal length (f). (Brightness decreases to 1/4 or less.)

■Small lens

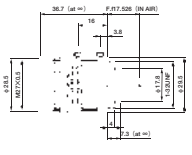
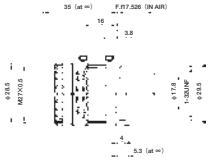
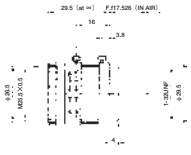
External view				
Model	**M118FM08**	**M118FM16**	**M118FM25**	**M118FM50**
CCD size	1/1.8 type	1/1.8 type	1/1.8 type	1/1.8 type
Focal length (mm)	8	16	25	50
Iris range	F1.4 ~ 16	F1.4 ~ 16	F1.6 ~ 16	F2.8 ~ 22
Field angle (H & V)	50.8° x 38.6°	25.9° x 19.5°	16.6° x 12.5°	8.3° x 6.2°
External dimensions (mm)	ϕ29 x 27.3	ϕ29 x 24.1	ϕ29 x 35	ϕ29 x 62.6
Weight (g)	44	39	39	52

■High-resolution lens

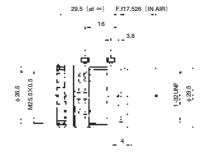
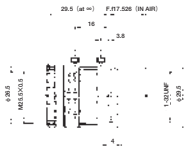
External view						
Model	**FL-HC1214-2M**	**FL-CC1614-2M**	**FL-CC2514-2M**	**FL-CC3516-2M**	**FL-CC5028-2M**	**FL-CC7528-2M**
CCD size	1/2 type	2/3 type	2/3 type	2/3 type	2/3 type	2/3 type
Focal length (mm)	F1.4 ~ F16	16	25	35	50	75
Iris range	12	F1.4 ~ F16	F1.4 ~ F16	F1.6 ~ F22	F2.8 ~ F22	F2.8 ~ F32
Field angle (°) horizontal	28.9	31.0	20.0	14.76	10.1	6.9
Vertical	21.9	23.4	15.1	11.10	7.6	5.18
External dimensions (mm)	ϕ29.5 x 28.5	ϕ29.5 x 33.2	ϕ29.5 x 32.0	ϕ29.5 x 35.4	ϕ29.5 x 34	ϕ34 x 59.6
Weight (g)	55	63	55	64	55	125
Remarks	w/Lock	w/Lock	w/Lock	w/Lock	w/Lock	w/Lock

C-mount lens (options)

■High-resolution lens

External view				
Model	**DF6HA-1**	**HF9HA-1**	**HF12.5HA-1**	**HF16HA-1**
CCD size	1/2 type	2/3 type	2/3 type	2/3 type
Focal length (mm)	6	9	12.5	16
Iris range	F1.2 ~ Close	F1.4 ~ Close	F1.4 ~ Close	F1.4 ~ Close
Field angle (°) horizontal	56° 09'	52° 06'	38° 47'	30° 45'
Vertical	43° 36'	40° 16'	29° 35'	23° 18'
External dimensions (mm)	φ29.5 x 36.7	φ29.5 x 35	φ29.5 x 29.5	φ29.5 x 29.5
Weight (g)	55	55	45	45

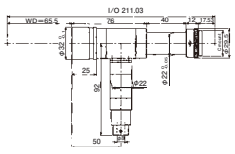
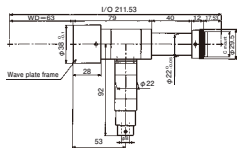
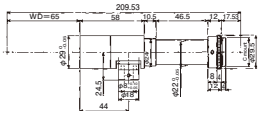
■High-resolution lens

External view				
Model	**HF25HA-1**	**HF35HA-1**	**HF50HA-1**	**HF75HA-1**
CCD size	2/3 type	2/3 type	2/3 type	2/3 type
Focal length (mm)	25	35	50	75
Iris range	F1.4 ~ Close	F1.6 ~ Close	F2.3 ~ Close	F2.8 ~ Close
Field angle (°) horizontal	19° 58'	14° 20'	10° 03'	6° 43'
Vertical	15° 02'	10° 46'	7° 33'	5° 02'
External dimensions (mm)	φ29.5 x 29.5	φ29.5 x 29.5	φ29.5 x 29.5	φ29.5 x 48
Weight (g)	45	45	45	55

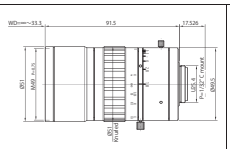
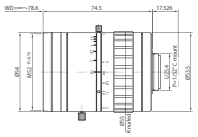
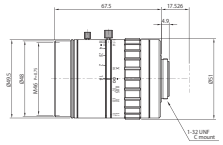
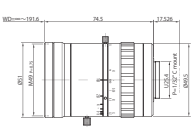
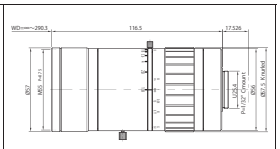
■High-resolution lens

External view			
Model	**23FM16SP**	**23FM25SP**	**23FM50SP**
CCD size	2/3 type	2/3 type	2/3 type
Focal length (mm)	16	25	50
Iris range	F1.4 ~ 22	F1.4 ~ 22	F2.8 ~ 32
Field angle (H & V)	30.9° x 23.4°	20.0° x 15.1°	10.1° x 7.6°
External dimensions (mm)	φ34 x 35.9	φ34 x 47.1	φ34 x 63
Weight (g)	80	103	117

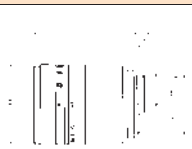
■Standard lens (1.1 type)

External view			
Model	**MP-1F-65-S**	**MP-1F-65P**	**MP-2F-65**
Magnification	1×	1×	2×
Lighting	Coaxial episcopic Illumination	Coaxial episcopic Illumination (polarized light type)	Coaxial episcopic Illumination
WD	65.5mm	63mm	65.5mm
NA	0.063	0.063	0.1
Optical distortion	0.1%	0.1%	0.4%
Resolution	5.4μm	5.4μm	3.4μm
Effective F No.	8	8	10
Type of telecentric	Object side	Object side	Object side

■High-resolution lens

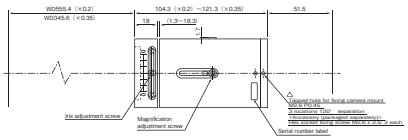
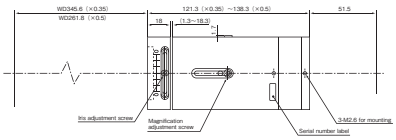
External view					
Model	**HF1618V**	**HF2514V**	**HF3514V**	**HF5018V**	**HF7518V**
CCD size	1.1	1.1	1.1	1.2	1.2
Focal length	16mm	25mm	35mm	50mm	75mm
Iris value	1.8	1.4	1.4	1.8	1.8
Minimum camera to subject distance	33mm	80mm	110mm	192mm	290mm
Minimum camera to subject magnification	0.3	0.3	0.3	0.3	0.3

TFL-II mount lens (options)

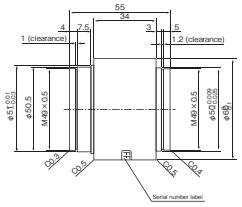
External view	Model	FV5026W-TFL II
	Focal length	50mm
	Max aperture ratio	1:2.6
	Image side	320 ～∞
	Resolving power (center)	200L/mm
	Optical distortion	0.11%
	Max image format	φ45mm

Applicable camera CSC12M25BMP19-01B and CSC12M25CMP19

External view				
Model	**LS05**	**LS07**	**LS10**	**LS15**
Magnification	0.5	0.7	1.0	1.5

External view		
Model	**ML-L02035**	**ML-L03505**
Focal length	×0.2 / ×0.35	×0.35 / ×0.5
Max aperture ratio	555.4±16.6 / 345.6±10.4	345.6±10.4 / 261.7±7.8
Iris range	Less than ± 0.1%	Less than ± 0.1%
Image circle	19.3μm / 12.6μm	12.6μm / 10μm
Flange back	F5.8 ～ 32 / F6.6 ～ 36.6	F6.6 ～ 36.6 / F7.4 ～ 41
Usable range of magnification	51.5	51.5

A special TFL-II lens adapter TFL-2-MTS is required to use the lenses shown to the left.



Ø12 camera (M10.5 P0.5 male) lens (options)

Applicable cameras: CS9301, CS9401, CS4300B, CS4301B

■Extension ring set

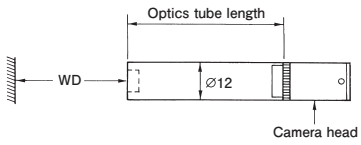
Used in conjunction with standard lenses.

- **CPLEXC9300–06060912A**
  Four piece set consisting of two 6-mm, one 9-mm, and one 12-mm rings.
- **EXC-12-201005**
  Three piece set consisting of one 5-mm, one 10-mm and one 20-mm rings.

■C-mount adapter

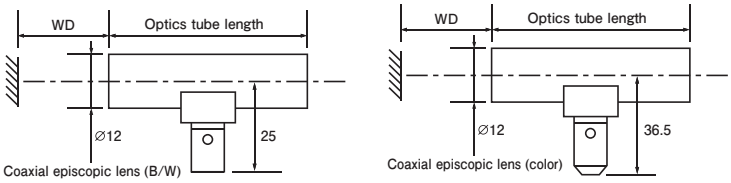
- **CPL6100A1050CA**

■High magnification lens



Model	Magnification	WD (mm)	Optics tube length (mm)
MPL-05LS	0.5×	111	50
MPL-075LS	0.75×	108	80
MPL-1LS	1×	70.5	68
MPL-2LS	2×	90	68
MPL-3LS	3×	70	80
MPL-4LS	4×	70	98
MPL-5LS	5×	70	106

■Coaxial episcopic lens

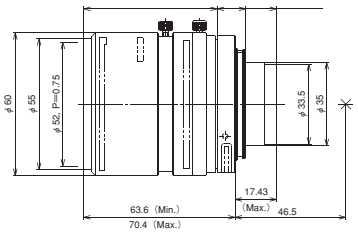
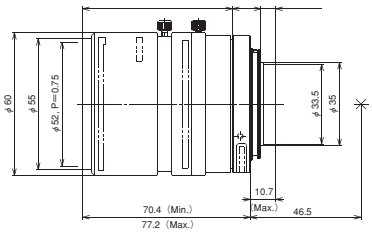


Model		Magnification	WD (mm)	Optics tube length (mm)
For color	For black and white			
MBL-2LSF	**MBL-2LS**	2×	90	68
MBL-3LSF	**MBL-3LS**	3×	70	80
MBL-4LSF	**MBL-4LS**	4×	70	98
MBL-5LSF	**MBL-5LS**	5×	70	106
MBL-6LSF	**MBL-6LS**	6×	64	116
MBL-7LSF	**MBL-7LS**	7×	58	128
MBL-8LSF	**MBL-8LS**	8×	56	137

F-mount lens (option)

Applicable cameras CSC12M25CMP19-01B, CSC12M25CMP19, CSX12M25CMP19 (adapter is required)

■F-mount lens (option)

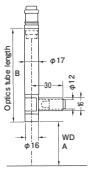
External view		
Model	**YF5028A-02**	**YF5028A-035**
Focal length	50 mm ±5% (∞)	
Max aperture ratio	1:2.8 (∞)	
Iris range	F2.8 to 22 (∞)	
Image circle	φ45	
Flange back	46.5	
Usable range of magnification	0.15 to 0.23	0.28 to 0.40

Ø17 camera (M15.5 P0.5 male) lens (option)

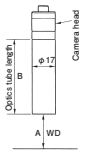
Applicable cameras CS9201, CS4200B

■Standard lens

■Coaxial episcopic lens

External view	Model	Magnification	WD (mm)	Optics tube length (mm)
	**PBL-2LS**	2×	70	116
	PBL-3LS	3×	70	110.5
	PBL-4LS	4×	70	121
	PBL-5LS	5×	70	121
	PBL-6LS	6×	70	126
	PBL-7LS	7×	70	135
	PBL-8LS	8×	70	146.5

■High magnification lens

External view	Model	Magnification	WD (mm)	Optics tube length (mm)
	**PL-075LS**	0.75×	110	54
	PL-1LS	1×	78	89.5
	PL-2LS	2×	78	89.5
	PL-3LS	3×	70	110
	PL-4LS	4×	70	121
	PL-5LS	5×	70	121
	PL-6LS	6×	70	126

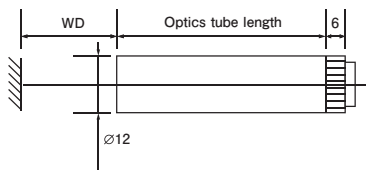
■C-mount adapter

- CPL5130A155CA

20 mm cube camera (M10.5 P0.5 female) lens (option)

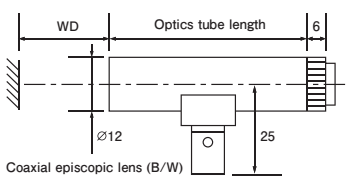
Applicable cameras CSCLV90BC3, CS4310B

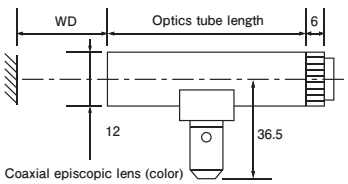
■High magnification lens



Model	Magnification	WD (mm)	Optics tube length (mm)
NMPL-05LS	0.5×	111	38.1
NMPL-075LS	0.75×	108	68.1
NMPL-1LS	1×	71	56.1
NMPL-2LS	2×	90	56.1
NMPL-3LS	3×	70	68.1
NMPL-4LS	4×	70	86.1
NMPL-5LS	5×	70	94.1

■Coaxial episcopic lens



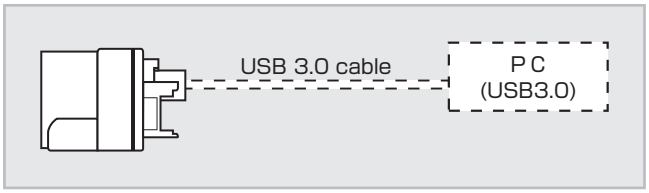


Model		Magnification	WD (mm)	Optics tube length (mm)
For color	For black and white			
NMBL-2LSF	**NMBL-2LS**	2×	90	56.1
NMBL-3LSF	**NMBL-3LS**	3×	70	68.1
NMBL-4LSF	**NMBL-4LS**	4×	70	86.1
NMBL-5LSF	**NMBL-5LS**	5×	70	94.1
NMBL-6LSF	**NMBL-6LS**	6×	64	104.1
NMBL-7LSF	**NMBL-7LS**	7×	58	116.1
NMBL-8LSF	**NMBL-8LS**	8×	56	125.1

Connection example

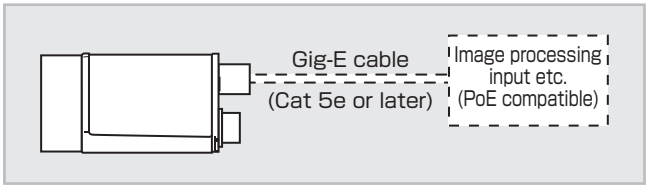
BU series USB3.0

BU031 / BU030 / BU080 / BU130



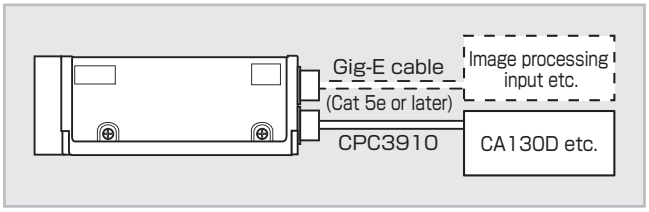
BG series Gig-E(PoE)

BG031 / BG030 / BG080 / BG130



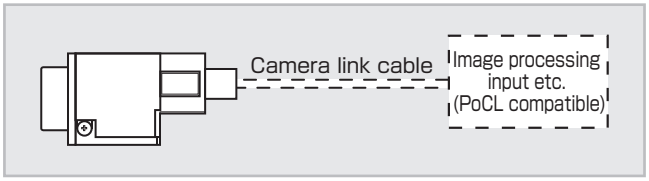
CSG series

CSGV90BC3-B / CSGX36BC3-B / CSGS20BC2-B /
CSGS15BC23-B / CSGU15BC18-B / CSGV90CC3-B /
CSGX36CC3-B / CSGS20CC2-B / CSGU15CC18-B



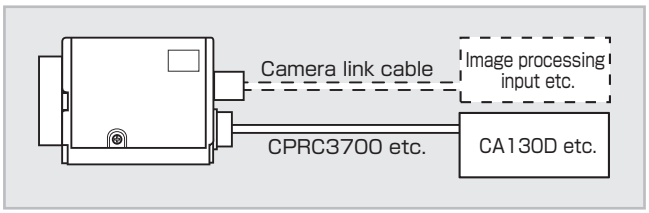
CSC series PoCL

CSCLV90BC3 / CSCV125BC3 / CSCV125CC3 /
CSCV90BC3 / CSCX30BC3 / CSCS20BC2 /
CSCU15BC18 / CSCU30BC18 / CSCU30CC18 /
CSC6M85BMP11



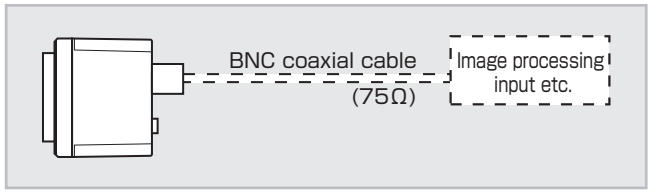
CSC series Non-PoCL

CSCQS15BC23 / CSCQS15CC23 / CSCQS9CC23 /
CSC12M25BMP19-01B / CSC12M25CMP19



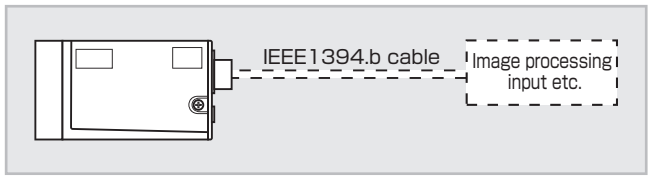
CSX series

CSX12M25CMP19



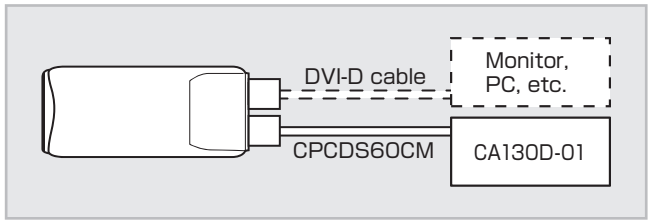
CSF series

CSFV90BC3-B / CSFX36BC3-B / CSFS20BC2-B /
CSFU15BC18-B / CSFV90CC3-B / CSFX36CC3-B /
CSFS20CC2-B / CSFU15CC18-B



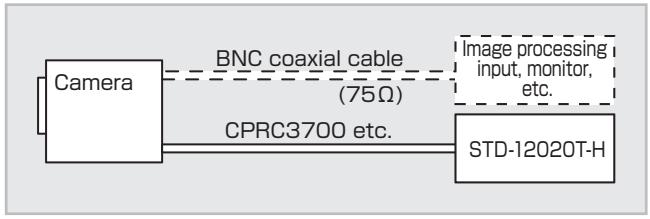
Full HD/HD camera

CSDW2M60CM28 / CSDS60CM3



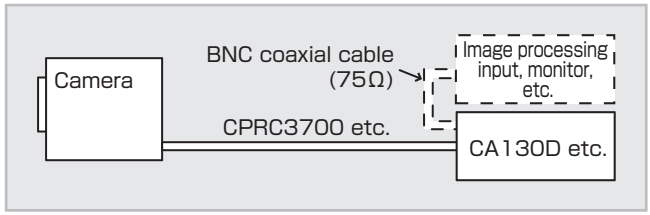
Analog camera When using STD

CS9201 / CS9301 / CS9401-03 / CS4200B /
CS4300B / CS4301B / CS4310B / CS8550Di/-50 /
CS8550i-01/-51 / CS8560BD / CS8570D / CS8310Bi /
CS8620Bi/BHi / CS8630Bi/BH



Analog camera When using CA130D

CS9201 / CS9301 / CS9401-03 / CS4200B /
CS4300B / CS4301B / CS4310B / CS8550Di/-50 /
CS8550i-01/-51 / CS8560BD / CS8570D / CS8310Bi /
CS8620Bi/BHi / CS8630Bi/BH



●These diagrams are schematic diagrams of connections, the shapes and positions of cables and connectors may be different from the actual cameras.

Glossary 1

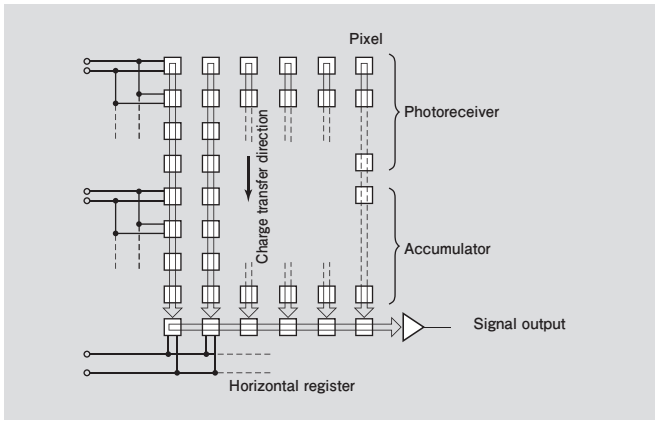
1. AGC circuit
Automatic Gain Control circuit. Controls gain automatically to maintain constant output signal levels.

2. ALC (ELC) function
Function to automatically vary the speed of the electronic shutter based on subject brightness to maintain constant output signals. This function is ideal for various applications - for example, when varying the magnification on TV-monitor microscopes. It can also be used in lieu of aperture adjustments with fixed-aperture lenses or optical systems that lack aperture control, like endoscopes.

3. Camera Link
Camera Link, an interface standard for communication between a camera and frame grabber board, has been reviewed and standardized by the AIA (Automatic Imaging Association) with the goal of standardizing previously non-standardized interfaces for cameras and grabber boards. The configurations are the base configuration (one cable) using one set to send and receive, the medium configuration (two cables) using two sets to send and receive, and the full configuration (two cables) using three sets to send and receive.

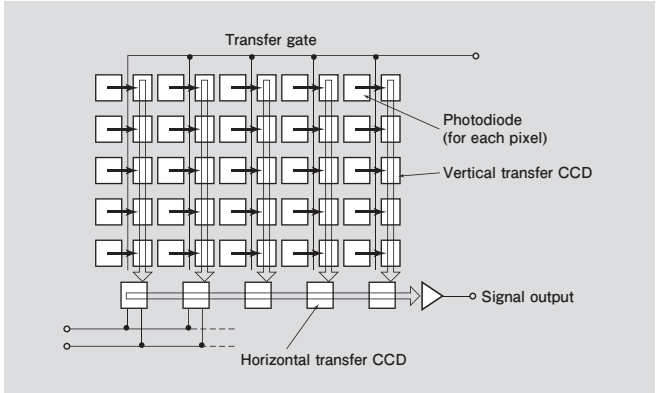
4. CCD solid-state image sensor
●Frame transfer CCD

A CCD that transfers signal charges photoelectrically converted at the photoreceiver to the accumulator during vertical flyback time and then scans in sequence for each line using a horizontal transfer CCD.

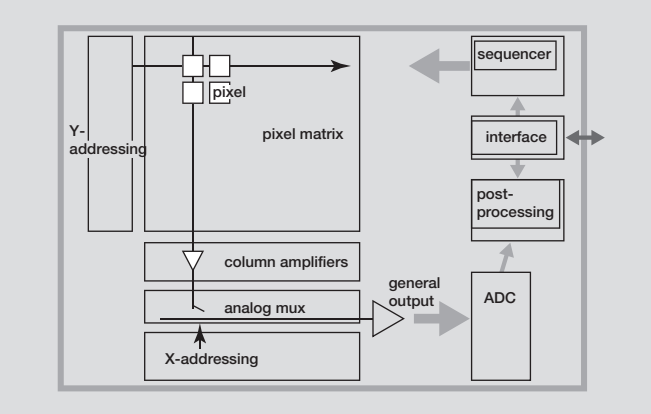


●Interline transfer CCD

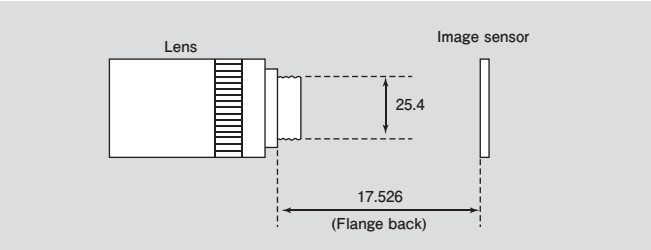
A CCD that transfers the signal charges photoelectrically converted at the photoreceiver en masse to the vertical register before transferring vertically, transferring horizontally, and scanning each line from the CCD.



5. CMOS image sensor
CMOS is an acronym for Complementary Metal Oxide Semiconductor, a widely-used semiconductor for LSIs and memory. A CMOS image sensor outputs images by scanning the photodiode and amplifier for each pixel. The main advantages are low current consumption and random scanning capacity.



6. C mount
A standard mount mechanism used to mount 16 mm imaging lenses, as shown in the figure below.



7. DVI-D
DVI is the acronym for Digital Visual Interface. It is a standard for interfacing LCDs and digital video equipment. It is recognized by the terminal, terminals for digital only are called DVI-D, and for both analog and digital, they are called DVI-I.

8. Gigabit Ethernet
The Ethernet connection format is specified by IEEE802.3u. Normally consisting of four pairs of unshielded twisted pair cables connected using RJ-45 connectors, this standard is compatible with the 10/100BASE-T format used in PC LAN networks. Supports data transfer rates of up to 1 Gbps. The main advantages of Gigabit Ethernet for FA cameras include the elimination of the need for dedicated data importing interface boards and the ability to use cables up to 100 m long.

9. HDMI
HDMI is an acronym for High Definition Multimedia Interface. This is a digital interface that carries video, audio, and control signals on one cable, it is an advancement of DVI.

10. IEEE1394
Standard for high-speed serial interfaces permitting transfer speeds of 100 Mbps or more. Transfer speeds are defined as 100 Mbps, 200 Mbps, and 400 Mbps, with standards also provided for speeds of 800 Mbps, 1.6 Gbps, and 3.2 Gbps or higher. IEEE 1394.a allows transfer speeds of up to 400 Mbps; IEEE 1394.b allows transfer speeds exceeding 800 Mbps. Allows up to 63 devices to be connected, with a maximum distance of 4.5 m between devices. Power can be supplied via the bus.

Glossary 2

11. OSD
An acronym for On-Screen Display, in which multiple setting menus are displayed on screen.

12. PoCL
An acronym for Power Over Camera Link, in which a power supply circuit has been added according to the CameraLink standard.

13. PoCL-Lite
This is a PoCL connection without the RGB transfer capability, there are 14 pin and 26 pin types.

14. PoE
An acronym for Power over Ethernet, the power is carried over the Gigabit Ethernet cables.

15. Raw data
Electronic signals captured from an image sensor, such as a CCD, that are directly digitalized. Further processing is required to view the data.

16. RoHS directive
RoHS is an acronym for Restriction of Hazardous Substances, a directive implemented by the EU in February 2003 to restrict the use of specified hazardous substances in electronic and electrical devices.

17. REACH directive
REACH is an acronym for Registration Evaluation Authorization and Restriction of Chemicals. It was implemented in the EU in December 2006 to limit the use of chemicals to protect human health and the environment.

18. SN ratio
The ratio of a TV camera output signal to the noise component found within the signal. It is expressed as the ratio in decibels of the rated signal output to the output when light is shielded.

19. TFL-II mount
A 48 mm diameter mount (threaded) compliant with the standard for lens mounts for machine vision.

20. TTL level
The signal level that can operate TTL within the voltage level required to operate a digital IC.

21. USB
An acronym for Universal Serial Bus, this standard for PC serial interfaces was jointly introduced by seven companies, including Intel and Microsoft. Data transfer speeds are 12 Mbps for full-speed mode and 1.5 Mbps for low-speed mode. USB 3.0, released in September of 2007, reaches a maximum of 4.8 Gbps.

22. WOI (Window of Interest) function
Scanning speeds for CMOS cameras can be increased by scanning only those areas specified by the user. Partial scanning with CCD cameras lets users set partial scanning limits only along a vertical axis; the WOI function allows scanning of areas specified in terms of both vertical and horizontal edges.

23. YUV
Data format for displaying luminance signals and color difference signals. It achieves high data compression ratios with little degradation.

24. Aspect ratio
The ratio of the vertical and horizontal size of a display screen. NTSC systems use a ratio of 4:3. A ratio of 1:1 is used for medical applications, including X-ray systems. A ratio of 16:9 is used for high definition TV.

25. Dark current
Dark current is a signal current present when all light to a lens is blocked; it increases with ambient temperature. Lower values are preferred for image processing applications.

26. Color temperature
The red/yellow/blue radiant energy distribution varies depending on ideal blackbody temperature. This temperature is expressed in K (Kelvin). Color temperature correction filtering or electrical color temperature correction is used, since differences in color temperature for color TV cameras can prevent accurate reproduction of color.

27. Interlacing
Also called interlaced scanning; images on TV monitors are created by scanning alternate lines, creating the completed image with the second scan.

28. Image band frequency
The frequency characteristics of an image signal, normally expressed as an output signal level for a constant sine wave input and the curve corresponding to the phase frequency.

29. Resolution
An indication of the ultimate detail with which a subject can be reproduced, resolution is generally measured by the number of black and white lines that can be reproduced per unit of screen height and width. Horizontal resolution describes the horizontal value, while vertical resolution describes the vertical value. If 500 white and black lines can be produced, the resolution is 500.

30. External synchronization
Used to synchronize scan timing when using multiple cameras simultaneously. This may include VBS, VS, or HD/VD. VBS also synchronizes the burst (color) signal. VS synchronizes vertical and horizontal scanning. HD and VD, respectively, synchronize vertical and horizontal scanning. External synchronization is also referred to as genlock (generator lock).

31. Pixel count (graphic) designations and units
Toshiba Teli defines computer pixel counts as follows:

Designation	Horizontal (H) × Vertical (V) dots lines
VGA	640×480
SVGA	800×600
XGA	1024×768
SXGA	1280 × 1024 or 1280 × 960
UXGA	1600×1200
QSXGA	2560×2048

32. Color bar
A color standard signal used to adjust the color of color monitors. This may take the form of a color bar signal generated electrically by a color bar generator circuit or a color bar chart used for camera adjustments. A color bar consists of seven colors - white, yellow, cyan, green, magenta, red, and blue - counting from left to right.

Glossary 3

33. Gamma (γ) characteristics

For TV cameras, this refers to the signal output for incident light; for monitors, this is the relationship between image brightness and input signals. Linear characteristics ($\gamma = 1$) are preferred for TV systems.

34. Polarity

Indicates the type of synchronizing signal, as shown below.

35. Global shutter function

An electronic shutter system in CMOS image sensors which enables exposure of all pixels simultaneously, as with CCDs. The electronic shutter systems used with earlier CMOS image sensors are called rolling or focal-plane shutters; these shutters typically produce anomalous images with moving subjects unless a mechanical shutter is used, since different pixels are exposed for each line at slightly different times.

36. Fixed pattern noise

Noise caused by irregularity in the amplifier of each pixel in the image sensor, normally this noise is very large in CMOS.

37. Composite synchronization signal

Combines vertical and horizontal synchronizing signals into a single system. Systems with separate vertical and horizontal synchronizing signals are called separate sync systems.

38. Minimum luminance

Refers to the maximum sensitivity of a TV camera under practical conditions. If luminance drops below this level, noise tends to increase significantly, and problems arise with contrast detection.

39. Shading noise

Refers to the distortion between highlights and shadows caused by variations in imaging sensitivity, subject brightness, light transmittance through the lens, and CRT illumination. Shading noise is normally expressed as the degree of signal nonuniformity when the imaging unit is subjected to uniform illumination.

$$\text{Shading} = \frac{\text{Signal maximum - signal minimum}}{(\text{Signal maximum + signal minimum})/2} \times 100\ (\%)$$

40. Shading noise correction

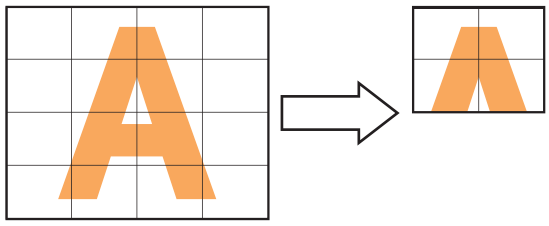
A sawtooth or parabolic waveform synchronized to the vertical and horizontal frequencies is normally added to the image signal to correct shading on-screen.

41. Depth of field

Refers to the range of distances over which the subject remains in focus. Depth of field increases as the camera is moved farther from the subject with short focal length lenses or stopped-down lenses.

42. Scalable

Allows scanning of the screen in units of 1/16th of the screen area. Only adjacent units of rectangular forms can be selected; units of irregular shapes are not permitted. In scalable mode, the camera scans only the specified sections at standard speed, rapidly skipping over other sections, reducing the trigger interval when vertical clipping widths are small. Note that trigger intervals cannot be reduced along the horizontal axis due to the CCD sensor operation mechanism, even when clipping width is reduced.



43. Smearing

Refers to bright banding that appears on screen in the presence of bright points of light in an imaging area. This phenomenon can cause vertical banding due to excessive charge build-up, particularly in TV cameras incorporating solid-state imaging sensors.

44. Square pixels (CCD)

Individual CCD pixels have equal vertical and horizontal dimensions, eliminating the need for correction processing in image processing. Square pixels are also known as square pixels.

45. TV format

●NTSC format

Standard color TV format used in countries such as Japan and the USA, with an aspect ratio of 4:3, horizontal scanning frequency of 15.734 kHz, and vertical scanning frequency of 59.94 Hz. This format is notable for its capacity to transmit color signals at a B/W TV format band frequency (6 MHz). Other color formats include PAL and SECAM.

●EIA format

Standard B/W TV camera format, with an aspect ratio of 4:3, horizontal scanning frequency of 15.75 kHz, and vertical scanning frequency of 60 Hz.

●CCIR format

Standard B/W TV camera format used in Europe, with an aspect ratio of 4:3, horizontal scanning frequency of 15.625 kHz, and vertical scanning frequency of 50 Hz.

●RGB format

Format in which the three primary color (red, green, blue) video signals are output together with a synchronizing signal. Compared to NTSC format, this produces high-resolution images with outstanding color reproduction and no cross color.

46. Electronic shutter

Used to produce blur-free images of moving subjects by reducing CCD accumulation times and to adjust sensitivity (e.g., for the ALC function).

Glossary 4

47. Electronic lines
Electrically generated lines that are superimposed on the monitor's screen to show horizontal and vertical.

48. Dot clock
Refers to the display time per dot (pixel) converted to frequency.

49. Non-interlacing (Progressive scanning)
A scanning method that scans sequentially, also known as progressive scanning. Interlaced scanning scans alternate lines; this system scans sequentially.

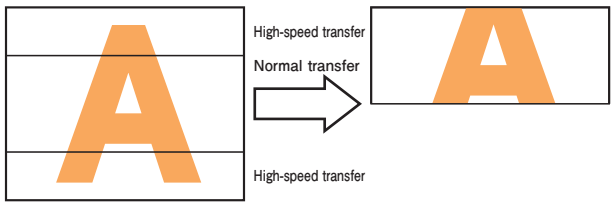
50. Hi vision
This indicates HDTV (high definition TV). Full hi vision is 1920 x 1080, there is also 720p (progressive at 1260 x 720 pixels) and 1080i (interlace at 1920 x 1080 pixels).

51. Binning
A function that increases sensitivity and enlarges the pixel area by combining several adjacent elements on a CCD. The number of pixels in the horizontal and vertical direction is indicated by binning 2 x 1, binning 2 x 2, etc.

52. Standard subject luminance
Refers to the luminance required to ensure optimal performance of TV cameras.

53. Field/Frame
A single scan from the top to the bottom of the screen is called the field. With interlaced scanning, a screen formed of two fields is called a frame.

54. Partial scanning
Refers to scanning partial areas vertically, such as the middle half; enables images to be output faster than conventional scanning. Programmable partial scanning also allows specification of areas using external pulses.



55. Flange back
Refers to the distance from the lens flange surface to the imaging plane in the imaging unit.

56. Flicker
Refers to the phenomenon of flickering light and dark screens when imaging under fluorescent lighting.

57. Blooming
Refers to a phenomenon in which intense light entering the imaging unit appears to spread to surrounding areas.

58. Full frame
Refers to the ability to output all data for a frame when using a random trigger shutter. Conventional systems generally enabled the capture of only data for a field (at half the nominal vertical resolution).

59. Frame rate
Refers to the number of frames captured per second. EIA format cameras are capable of 30 frames per second. High-speed cameras achieve 60 fps, and high-resolution cameras 12 fps.

60. Spectral sensitivity characteristics
Imaging units may exhibit differences in sensitivity to different colors (wavelengths) and to intensity.

61. White clip
Image contrast may become blurred, making the image hard to view when the TV screen includes intense spot lights. This is resolved using a white clip circuit to compress video signals with levels exceeding a preset value.

62. White balance
Refers to the color balance for devices such as color TV cameras and color monitors. Adjusting the image so that white objects appear white is called white balance adjustment.

63. Multiple shutter
Outputs images exposed using the external trigger signal according to the scanning signal with functions applying a random trigger shutter. Overlapping exposures are possible until the scanning signal is input, enabling strobe-like imaging with moving subjects if the trigger signal is input continuously during imaging. This can also be effective, when using multiple cameras, for inputting simultaneously-exposed images to a processing system by shifting the timing.

64. Multi slope (Dual slope)
Achieves a wide dynamic range by compressing contrast on the CMOS sensor itself. This parameter can be manually set by the user, or a pre-set parameter can be selected from an external device.

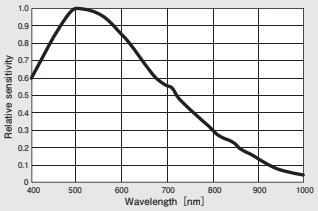
65. Moiré
Refers to the phenomenon in which fringes appear on the screen when imaging subjects with a fine grid pattern.

66. Restart/Reset
Images can be obtained at the desired timing according to the restart reset pulse input (VD input) for continuous HD input. This can be used to obtain high sensitivity with long accumulation times, since images are easily produced at low shutter speeds.

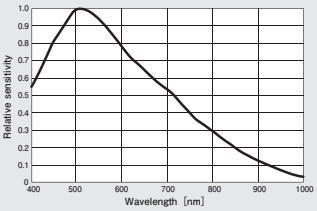
Spectral sensitivity characteristics 1

BU/BG series

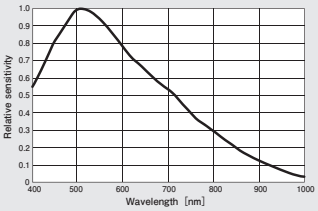
BU031／BU030／BG031／BG030



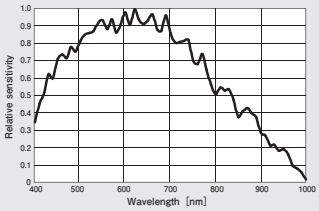
BU080／BG080



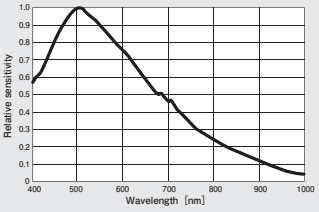
BU130／BG130



BU406M

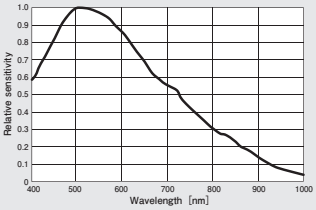


BG202

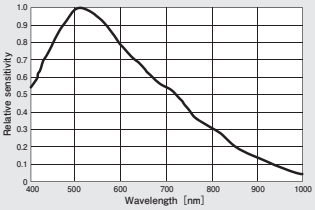


CSG series

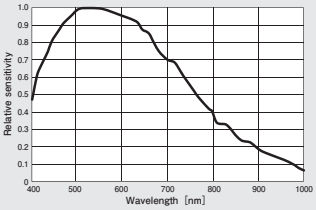
CSGV90BC3-B



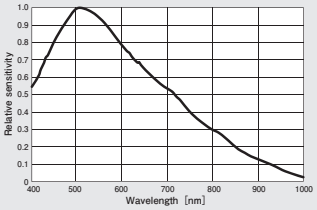
CSGX36BC3-B



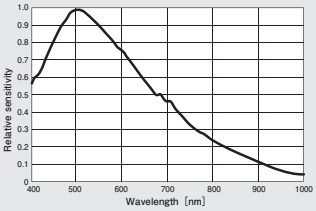
CSGS15BC23-B



CSGS20BC2-B

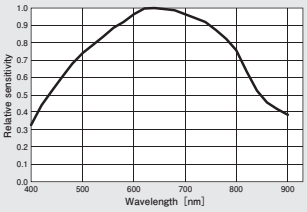


CSGU15BC18-B

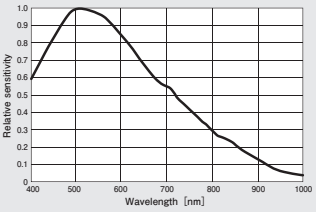


CSC series

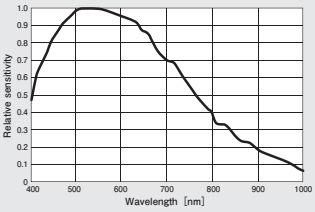
CSC12M25BMP19-01B



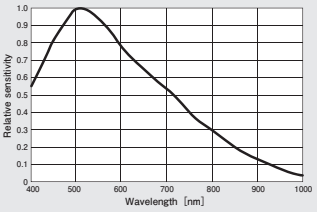
CSCLV90BC3／CSCV90BC3／CSCV125BC3



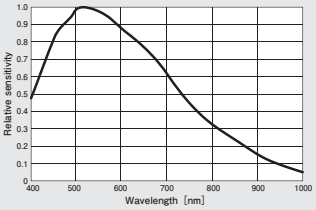
CSCU15BC18／CSCU30BC18



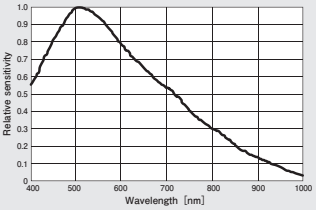
CSCX30BC3



CSCQS15BC23



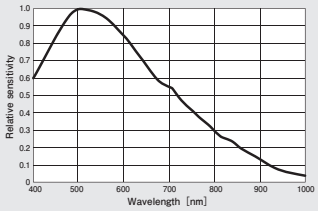
CSCS20BC2



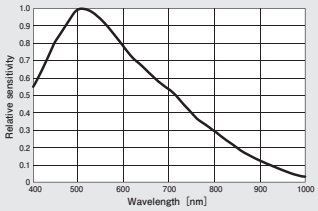
Spectral sensitivity characteristics 2

CSF series

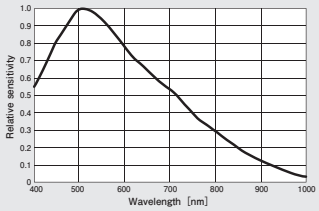
CSFV90BC3-B



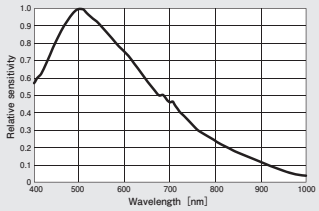
CSFX36BC3-B



CSFS20BC2-B

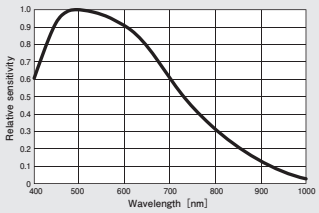


CSFU15BC18-B

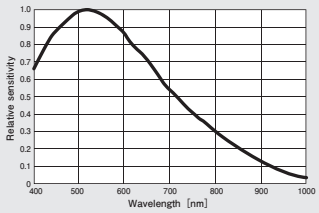


B/W camera (remote head type)

CSH4200B

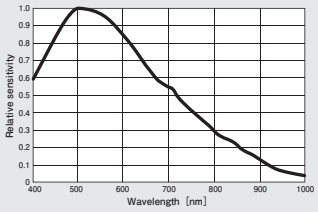


CSH4300B／CSH4301B／CSH4310B

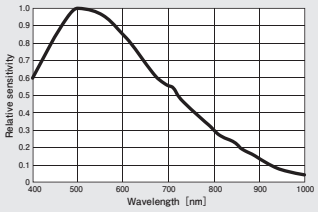


B/W camera (integral type)

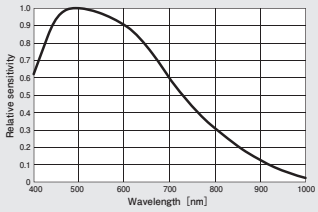
CS8310Bi／CS8550Di/-50／
CS8550i-01/-51



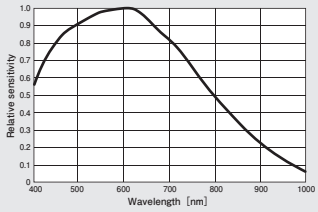
CS8560BD／CS8570D



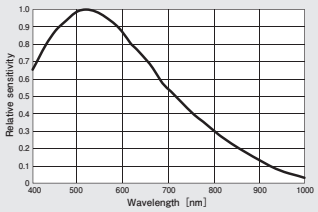
CS8620Bi



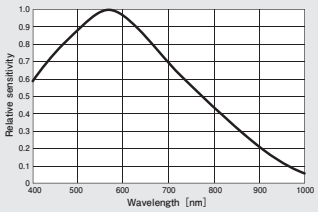
CS8620BHi



CS8630Bi



CS8630BH



PIN assignment

Standard pin assignment for individual camera DC IN connectors. Please see user guide for details.

■BG series

Applicable connectors (cable side): HR10A-7P-6S (73) (HIROSE) or equivalent

Pin No.	I/O	Assignment
1	I	+12V
2	I	Line 0
3	O	Line 1
4	O	Line 2
5	—	I/O GND
6	—	GND

■CSG series

Gigabit Ethernet connector
Camera side: P65-P01-19V8 (SpeedTech)

TRIG IN Connector
HR10A-7R-6PB (73) (HIROSE)
Cable side: HR10A-7P-6S (73) (HIROSE)

Pin No.	I/O	Assignment	Pin No.	Assignment
1	I/O	BI_DA+	1	BUSY_OUT
2	I/O	BI_DABI_	2	GND
3	I/O	DB+	3	GND
4	I/O	BI_DC+	4	TRIG_IN
5	I/O	BI_DCBI_	5	EXPOSE_OUT
6	I/O	DBBI_	6	+12V
7	I/O	DD+		
8	I/O	BI_DD−		

■CSCU30BC18/CC18

Applicable connectors (cable side): HR10A-10P-12S (HIROSE) or equivalent

Pin No.	I/O	Assignment
1	—	GND
2	—	N.C.
3	—	N.C.
4	—	N.C.
5	—	GND
6	—	N.C.
7	O	VD
8	—	GND
9	—	N.C.
10	O	WEN.
11	I	TRIG
12	—	GND

■CSCQS15BC23/CC23/CSCQS9CC23

Applicable connectors (cable side): HR10A-10P-12S (HIROSE) or equivalent

Pin No.	I/O	Assignment
1	—	GND
2	I	+12V
3	—	N.C.
4	—	N.C.
5	—	GND
6	—	N.C.
7	O	VD
8	—	GND
9	—	N.C.
10	O	WEN.
11	I	TRIG
12	—	GND

■CSC6M85BMP11

Applicable connectors (cable side): HR10A-7P-6S (HIROSE) or equivalent

Pin No.	I/O	Assignment
1	O	GPO
2	—	GND
3	—	GND
4	I	TRIG
5	—	N.C.
6	—	DC+12V(option)

■CSC12M25BMP19-01B/CSC12M25CMP19

DC IN/SYNC Connector Plug
Camera side: HR10A-10R-12PB (HIROSE)
Cable side: HR10A-10P-12S (HIROSE)

Pin No.	I/O	Assignment
1	—	GND
2	I	+12V
3	—	GND
4	—	N.C.
5	—	GND
6	I	N.C.
7	I	N.C.
8	—	GND
9	—	N.C.
10	—	N.C.
11	I	TRIG
12	—	GND

■CSF series

IEEE1394 connector
HSR-BV011 (COMOSS)

TRIG IN Connector
Camera side: HR10A-7R-4PB (73) (HIROSE)
Cable: HR10A-7P-4S (73) (HIROSE)

Pin No.	Assignment	I/O	Pin No.	Assignment	I/O
1	TPB(-)	I/O	1	PIO input	I
2	TPB(+)	I/O	2	GND	—
3	TPA(-)	I/O	3	PIO output	O
4	TPA(+)	I/O	4	GND	—
5	TPA(R)	—			
6	VG	—			
7	SC	—			
8	VP	I			
9	TPB(R)	—			

■CSDS60CM3/CSDW2M60CM28

Mini-USB connector
Camera side: UX60SC-MB-5ST (80) (HIROSE)

Pin No.	Assignment	I/O
1	POWER	—
2	USB D−	I/O
3	USB D+	I/O
4	N.C.	—
5	USB_GND	—

■CS8560BD/CS8570D/CS8550Di/-50/CS8550i-01/-51

Applicable connectors HR10A-10P-12S

Pin No.	CS8560BD/CS8570D	CS8550Di/-50	CS8550i-01/-51
	Assignment		
1	GND		
2	+12V		
3	VIDEO GND		
4	VIDEO OUT		
5	HD GND		
6	HD IN		
7	VD IN		
8	TRIG GND		
9	N.C.		TRIG IN
10	WEN OUT		GND
11	TRIG IN		+12V
12	VD GND		

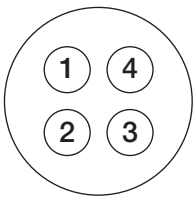
■CS8620Bi/30Bi/20BHi/30BH/CS4000B series

Applicable connectors HR10A-10P-12S

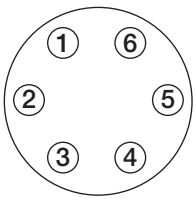
Pin No.	External synchronization			Internal synchronization
	HD・VD	VS/SYNC	Restart/Reset	
1	GND			
2	+12V			
3	GND			
4	VIDEO OUT			
5	GND			
6	HD IN	—	HD IN	HD OUT *
7	VD IN	VS/SYNC IN	R.R IN	VD OUT *
8	GND			
9	CLK OUT			
10	WEN OUT		—	WEN OUT
11	TRIG IN			
12	VD GND			

*HD and VD output is enabled through a switch on the back panel of the camera for internal synchronous operation.

4pin



6pin



12pin

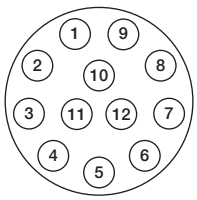


Diagram of receptacle as seen from connection side (back of camera/CCU).

Available boards

ANALOG

Camera	Maker	Board model
CS8550Di	Cognex	MVS-8500Le/MVS-8501/MVS-8504/e
	FAST	FVC-05/FV-GP440
	Matrox	MeteorII-MultiChannel
	Micro Technica	MTPCI-DC2-G/DX-G/DD2-G/DM2-G /MTPEX-DX-G
	Euresys Inc.	Domino Series
	LinX	GINGA ++M2/M4
CS8550Di-50	FAST	FVC-05/FV-GP440
CS8550i-01	Edec Linsey System	MUCap-HA2/HA4
	Micro Technica	MTPCI-DC2-G/DX-G/DD2-G/DM2-G /MTPEX-DX-G
	Matrox	Solios-Analog
	Euresys Inc.	Domino Series
	Renesas Northern Japan Semiconductor	VP-Ax100/Ax110
	LinX	GINGA ++M2/M4/M1e/2e/4e
CS8550i-51	Edec Linsey System	MUCap-HA2/HA4
	FAST	FVC-05/FV-GP440
	Renesas Northern Japan Semiconductor	VP-Ax100/Ax110
CS8560BD	Asia Electronics	PRS-800
	Cognex	MVS-8500Le/MVS-8501/MVS-8504/e
	FAST	FVC-05/FV-GP440
	Matrox	Solios-Analog/MeteorII-MultiChannel
	Euresys Inc.	Domino Series
	LinX	GINGA ++M2/M4/M1e/2e/4e
CS8570D	Asia Electronics	PRS-800
	Cognex	MVS-8500Le/MVS-8501/MVS-8504/e
	DALSA	PC2-Vision
	FAST	FVC-05/FV-GP440
	Matrox	Solios-Analog/MeteorII-MultiChannel
	Euresys Inc.	Domino Series
CS8620Bi	Cognex	MVS-8500Le/MVS-8501/MVS-8504/e
	DALSA	PC2-Vision
	Micro Technica	MTPCI-DC2-G/DX-G/DD2-G/DM2-G /MTPEX-DX-G
	Matrox	Solios-Analog
	LinX	GINGA ++M2/M4/M1e/2e/4e
CS8630Bi	DALSA	PC2-Vision
	Matrox	Solios-Analog
	LinX	GINGA ++M2/M4/M1e/2e/4e
CS4301B	Cognex	MVS-8500Le/MVS-8501/MVS-8504/e
	Micro Technica	MTPCI-DC2-G/DX-G/DD2-G/DM2-G /MTPEX-DX-G
	Matrox	Solios-Analog

CameraLink

Camera	Maker	Product (model)
CSCLV90BC3	Aval Data	APX-3311
	Graphin	IPM-5512-Lite/5514-Lite
	Micro Technica	MTPEX-DL-G
CSCV90BC3	Aval Data	APX-3312
	Interface	PEX-H530821/-H530921/-H531021 /-H531122
	Matrox	Solios-CameraLink
	Graphin	IPM-8531PoCL-BE/8580CL-M(PoCL) /IPM-5512
	Cognex	MVS-8600
	Micro Technica	MTPCI-TL2/PL-G MTPEX-PL-G/ML-G/QL-G/DL-G/FL-G
	Photron	FDM-PCIe CL
	Euresys Inc.	Grablink Series
CSCX30BC3	Aval Data	APX-3312
	Interface	PEX-H530821/-H530921/-H531021 /-H531122/CPZ-530421/-530521/LPC-530421/-530521/PEX-530421/-530521
	Matrox	Solios-CameraLink
	Graphin	IPM-8531PoCL-BE/8580CL-M(PoCL) /IPM-5512
	Cognex	MVS-8600
	Micro Technica	MTPCI-TL2/PL-G MTPEX-PL-G/ML-G/QL-G/DL-G/FL-G
	Photron	FDM-PCIe CL
	Euresys Inc.	Grablink series
	LinX	GINGA digital CL2/CL2e/4e
CSCS20BC2	Graphin	IPM-8531PoCL-BE/8580CL-M(PoCL) /IPM-5512
	Photron	FDM-PCIe CL
	Micro Technica	MTPCI-TL2/PL-G MTPEX-PL-G/ML-G/QL-G/DL-G/FL-G
	Matrox	Solios-CameraLink
	LinX	GINGA digital CL2/CL2e/4e

CameraLink

Camera	Maker	Product (model)
CSCU15BC18	Aval Data	APX-3312
	Interface	PEX-H530821/-H530921/-H531021 /-H531122
	Graphin	IPM-8531PoCL-BE/8580CL-M(PoCL) /IPM-5512
	Matrox	Solios-CameraLink
	FAST	FHC3312
	LinX	GINGA digital CL2/CL2e/4e
CSCU30BC18	Aval Data	APX-3312/3313
	Graphin	IPM-8531PoCL-BE/8580CL-M(PoCL) /IPM-5512
	Micro Technica	MTPCI-TL2/PL-G MTPEX-PL-G/ML-G/QL-G/DL-G/FL-G
	Matrox	Solios-CameraLink
	FAST	FHC3312
	LinX	GINGA digital CL2/CL2e/4e
CSCQS15BC23	Aval Data	APX-3312/3318
	DALSA	X-64 CL ipro
	FAST	FVC06
	Photron	FDM-PCIe CL
	Micro Technica	MTPCI-TL2/PL-G MTPEX-PL-G/ML-G/QL-G/DL-G/FL-G
	Matrox	Solios-CameraLink
	LinX	GINGA digital CL2e/4e
CSCU30CC18	Aval Data	APX-3312/3313/3318
	Soliton Systems	EXpresso Series
	Photron	FDM-PCIe CL
	Micro Technica	MTPCI-TL2/PL-G MTPEX-PL-G/ML-G/QL-G/DL-G/FL-G
	LinX	GINGA digital CL2e/4e
CSCQS15CC23	Aval Data	APX-3312
	Interface	PEX-H530821/-H530921/-H531021 /-H531122
	Graphin	IPM-8531PoCL-BE/8580CL-M(PoCL) /IPM-5512
	Cognex	MVS-8600
	Photron	FDM-PCIe CL
	Matrox	Solios-CameraLink
	Micro Technica	MTPEX-QL-G/DL-G/FL-G
	LinX	GINGA digital CL2e/4e
CSC12M25BMP19-01B (*1)	Aval Data	APX-3312/3313/3318
	Edec Linsey System	MUCap-HD2
	Graphin	IPM-8531PoCL-BE/IPM-5512 IPM8580-CL
	Cognex	MVS-8600
	DALSA	X-64 Xcelera-CL PX4 Dual
	DITECT	DPX-CLM100
	National Instruments Japan	PCIe-1429
	FAST	FHC3312/3313
	Matrox	Solios-CameraLink
	LinX	GINGA digital CL2e/4e
CSC12M25CMP19	Aval Data	APX-3312/3313/3318
	Micro Technica	MTPEX-FL-G
	DALSA	X-64 Xcelera-CL PX4 Dual

IEEE1394

Camera	Maker	Board model
CSF Series	Technoscope	PFW-85/86/87/88/CFW-81

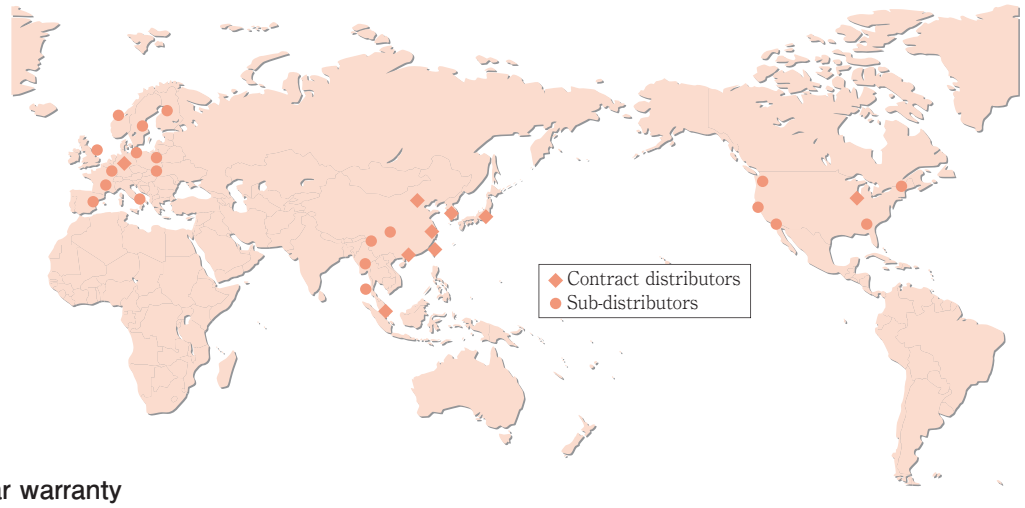
CoaXPress

Camera	Maker	Board model
CSX12M25BMP19	Aval Data	APX-3662

(*1) Some functions are not available

Product assurance and service system

Toshiba Teli products are subject to a total in-house production system from the procurement and supply of components to assembly, wiring, and inspection.
Reliability and quality are assured through a quality control traceability system complying with national standards.



One-year warranty

All products will be repaired free of charge for any defects attributable to Toshiba Teli arising within one year of delivery.

After-sales service

Customers demand comprehensive and fast service operations. Toshiba Teli offers prompt after-sales service centering on Tokyo and Kobe.
In the event that a fault occurs in a product, please contact the nearest sales office or distributor.
We will act appropriately and promptly. The service data obtained will be analyzed and used to implement improvements to prevent future failures on the user end.

Demonstrations

A range of demonstration products is available for customers who wish to try out the products or want to learn more about them. Please feel free to utilize these.

Catalogs and literature requests

Customers wanting more detailed technical information than that provided in demonstrations or product catalogs should contact the nearest sales office.

Headquarters

Showroom

Please read the following disclaimers before using Toshiba Teli products.

Disclaimers

- Toshiba Teli accepts no responsibility for losses arising from fire, earthquake, other accidents attributable to external causes or attributable to negligence or errors on the part of the user, improper use or use under abnormal circumstances.
- Toshiba Teli accepts no responsibility for incidental losses (including business losses or losses from business suspension) arising from use or non-use of these products.
- Toshiba Teli accepts no responsibility for losses arising from use other than as described in the corresponding instruction manuals (including hot-swapping or turning off power while saving data).
- Toshiba Teli accepts no responsibility for losses arising from malfunctions attributable to use in combination with other devices.
- Toshiba Teli accepts no responsibility for losses arising due to repairs or modifications performed by the customer or final user.

●The information in this catalog is current as of January 2014. ●The information in this catalog is subject to change without notice.

Environmental preservation activities

At Toshiba Teli, we believe it is our responsibility to pass on our irreplaceable global environment to the next generation in a healthy condition. Therefore, we participate in environmental preservation activities. To reduce the burden on the earth's environment throughout the product lifecycle, we are promoting the development of environmentally conscious products (ECP) through technologies such as lead-free manufacturing and energy conservation.

- Development of environmentally conscious products
- Promotion of green procurement
- Reduction of and safe handling of harmful chemicals
- Reduction in scrap, promotion of recycling
- Promotion of energy conservation, centered on control of power consumption

Quality control system

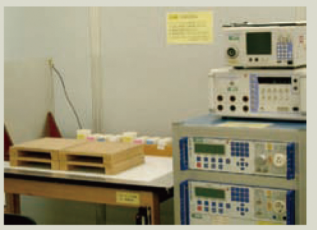
Leading the industry, Toshiba Teli was certified for the international quality management system ISO 9001 in 1994. We are promoting quality improvement activities in order to provide safe and security products that satisfy our customers around the world.

Quality policy

We will strengthen the quality of all business activities, improve customers' satisfaction, and to aim to be one of the top global companies with the continuous technological innovation and wholehearted manufacturing.

RF anechoic chamber

We use our RF anechoic chamber to test our products and assure they satisfy international standards for immunity, the ability to not malfunction when exposed to electromagnetic waves from other equipment, and for emissions, unintended electromagnetic radiation from the product.



Shielded room

We use our shielded room to test products against static electricity, power surges, and bursts of static from power lines. Specifically, our products bound for international markets meet the required standards of each country and are labeled with the CE mark for EU countries and the KC mark for Korea.

Temperature chamber

We use our temperature chamber to do environmental tests on our products to determine operating and storage temperatures. To confirm the safety of our products, we test abnormal conditions in the worst case scenarios by exposing the products to extreme heat and humidity and then testing for leaks and pressure resistance.

Vibration and shock testing lab

We use our vibration and shock testing lab to test the reliability and safety of our products in a wide range of operating environments that include automated factories, medical facilities, testing laboratories, and more. Whenever necessary, we acquire safety certifications, such as the TÜV-GS and GM marks for international markets and the UL and ETL marks for markets in the USA.

CAMERA CATALOG ALL MODELS

TOSHIBA TELI CORPORATION URL : http://www.toshiba-teli.co.jp/index.htm

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